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ROCKS and MINERALS

Vol. 6. No. 1. MARCH, 1931 Whole No. 19

Courtesy of Fred W. Schmeltz.

ENTRANCE TO GRAPHITE MINE
Porters Corners, Near Saratoga, N. Y.

Featured in This Issue

A NON-TECHNICAL MAGAZINE
—ON—
MINING - PROSPECTING - GEOLOGY - MINERALOGY

THE BULLETIN BOARD

THANK YOU!

The Editor wishes to express his sincere appreciation for cards and other remembrances sent him for Christmas by so many subscribers to Rocks and Minerals.

OUR FIFTH ANNIVERSARY NUMBER

The September, 1931 issue will be our Fifth Anniversary Number and we hope to commemorate this event with a larger and more attractive number than any that has yet made its appearance.

We would be grateful for any assistance our readers and subscribers may extend to us in order to make the Fifth Anniversary Number a success and worthy of a mineralogical magazine. Those who plan to carry advertisements in the September issue are urged to make reservations at their earliest convenience. Forms will close on July 20th.

THE WORKING OF SEMI-PRECIOUS STONES

By J. H. Howard

A Brief Elementary Monograph

Our readers will hail with delight the announcement that there is now in the course of preparation a very complete article on the cutting and polishing of semi-precious stones—written in non-technical language and illustrated. This will be issued by Rocks and Minerals as a separate pamphlet of about 30-40 pages. Price $1.00.

Mr. Howard, the author, after much research work and many experiments, has evolved a system that can easily be followed by amateurs and he sets forth his ideas and method in an interesting manner. A chapter listing all equipment with prices for each item and where it can be obtained is a special feature.

The pamphlet will be issued by or before May 1st and advanced orders are now being taken.

Advertisements will also be featured and forms will close April 1st. For rates, address the Editor of Rocks and Minerals

ROCKS AND MINERALS MONTHLY FUND

From time to time we receive suggestions from our subscribers in regard to a monthly but it takes one of our younger subscribers to actually take the initiative in putting his suggestion into use. This subscriber, learning that we need a fund of $5,000 before the magazine can be issued monthly, suggests a monthly fund to which subscribers and friends of Rocks and Minerals may contribute and to show his keen interest he enclosed $5 as his contribution.

We take pleasure, therefore, in announcing the Rocks and Minerals Monthly Fund, founded by William C. McKinley, of Peoria, Illinois. (See page 34—this issue).

Some few months ago Ernest M. Skea of Pilgrim's Rest, Transvaal, South Africa, donated some special stamps, most of which have been sold, and the proceeds are here added to the fund.

The Rocks and Minerals Monthly Fund

William C. McKinley, Peoria, Illinois	$ 5.00
Ernest M. Skea, Transvaal, South Africa	20.00
Total to date	$25.00

WANTED: Correspondents in all parts of the world who will be kind enough to send us notes and news items on minerals, etc., that they think may be interesting to the subscribers of Rocks and Minerals. Such as are available we shall be very glad to print in the magazine.

ROCKS and MINERALS

A NON-TECHNICAL MAGAZINE
—ON—
MINING—PROSPECTING—GEOLOGY—MINERALOGY

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Authors alone are responsible for statements made and opinions expressed in their respective articles.

ROCKS AND MINERALS PEEKSKILL, N. Y., U. S. A.

The Official Journal of the Rocks and Minerals Association

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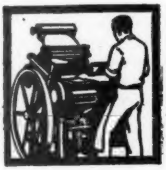
ROCKS and MINERALS

Edited and Published by Peter Zodac

PUBLISHED QUARTERLY



MARCH 1931

Osmiridium Mining in Tasmania

By

P. ORMSBY LENNON,

Royal Empire Society, Northumberland Ave., London, England.

As far back as 1804, Smithson Tennant, a British scientist, first announced the existance of two mineral substances known as iridium and osmium, and about a year after, another scientist discovered that the two substances were found together combined with a rare metal associated with platinum. The combination he termed iridosmine. By this latter name the metal in question is known in scientific circles today, but to miners and ordinary laymen it is known as osmiridium, or colloquially, "ossie". Investigation showed the new metal betrayed distinctive features that platinum did not possess. As time went on, these features attracted commercial attention, and gradually the metal obtained an independent market, quite apart from platinum. Just now, the world's main supply comes from the Rand in South Africa, where it is obtained as a platinum ore by-product, and from Tasmania, where it is found in a "free" or alluvial state.

The component metals of this valuable native alloy vary in different localities, but for the most part they mainly consist of iridium and osmium, together with smaller percentages of rhodium, ruthenium, and palladium. The hardness of osmiridium is from 6 to 7, and the specific gravity from 19.3 to nearly 22, or about one-fifth heavier than gold. It is, as a matter of fact, **the heaviest metal in the world.** The color is tin-white to light steel-gray. The Tasmanian sort usually occurs in irregular flattened grains, and has a basal cleavage like mica. The tin-white variety known as **nevyanskite** contains over 40% iridium; while the variety known as **siserskite** contains much less iridium and more osmium. The lustre of the latter tends to bluish-gray.

When operating in the north-west of the Island years ago, prospectors for gold found, when panning off, an unknown metal of tin-white color, which weighed more than gold itself. They considered it an obnoxious impurity because it was difficult to separate it from gold without quicksilver, and because a penalty of 7s. 6d. an ounce was imposed by the Mint for its nonremoval. Eventually, however, it was recognized as osmiridium. It was not until 1910 that the Mines Department officially took notice of this metal among its mineral resources. The price then obtained was £4.10s. an ounce. As time went on, the price continued to rise intermittently, and in 1921 touched £42.10s., the highest price ever obtained in Tasmania. It is said that the London price once reached the surprising figure

of £85 an ounce. (A £ is worth approximately $5.00; a s. 25c).

The first Tasmanian fields soon became exhausted, and it was not until 1925 that a new one was discovered out in the wild and almost unexplored Adams River district lying out to the west of the Island. In the middle of that year a stampede to the new discovery took place, culminating in the biggest rush that has occurred in Australia since the gold boom days of last century. Among the throng of fortune hunters that flocked to the new El Dorado, were men from every walk of life. It was just as if the roaring fifties were re-incarnated.

Though only about 30 miles from Fitzgerald, the little timbermilling post at the Derwent Valley railhead, Adams River was not easy of access. The route there lay through dense rain-forests and swamps, and over high mountains and unbridged creeks and rivers. It was only possible to take pack-horses out part of the way in the beginning, as the country was so rough and scrubby that they could not get through to the field. Intending diggers, therefore, had to "hump their swags" the rest of the way. As these frequently weighed between 75 and 100 pounds the rest of the journey was slow and arduous work. There was no track beyond a sort of path which had been beaten down by the first rushers, and, owing to the heavy traffic, it was deep in mud. It was also littered with the fallen trunks of enormous trees. A man cumbered with a heavy pack, therefore, found it no easy matter to get through to the field in those days. The rush took place in the middle of the Antipodean winter, the worst experienced for many years. Torrential rains fell nearly all the time, and these were only varied by severe snowstorms and blizzards which lasted for days on end. Old Klondikers said it put them in mind of the days of '98.

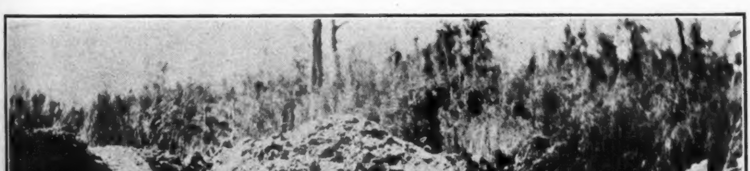
The mining field of Adams River lies in a broad glacier valley between the Ragged and Sawback Ranges, two serrated ridges with a northward trend, in the main composed of Cambrian conglomerates and quartzites. Much glacial evidence in the shape of ice-worn stones and perched blocks is to be seen in the district. At the base of the valleys are found the comparatively soft rocks, limestone, sandstone, slate and serpentine. As in the rivers of the north-west the basic serpentized rocks, bronzitite and peridotite, are the sources of the osmiridium. The most productive rocks are pale green and white sandstones formed from the waste of serpentines and quartzites. As far as the writer knows, the age of these sandstones has not been finally determined, but Mr. A. McIntosh Reid (Director of Mines, Tasmania) is of the opinion that

The author in one of his prospecting camps during the "rush."

The Thumbs (3680 feet high), the mountain to be crossed just before the diggings were reached.

they are either Permo-Carboniferous or Tertiary formation. Being even-grained they are not of glacial formation, but represent strata formed by the action of running water. The waters playing on the serpentines and quartzites carried the osmiridium and chromite away and deposited them in the valleys now occupied by these sandstones. In parts, however, it seems likely that some of the metal was carried off by glacial action.

A few extraordinary rich occurrences of osmiridium were located at the Thumbs end of the serpentine belt which



Digger panning off his day's accumulation of metal.

extends for some miles along the western fall of the Sawback Range. On one claim here the metal found was very coarse-particled, lying apparently where it was originally shed. In many cases it was found concentrated in joints and fractures of the rocks, some 18 inches under the soil. The chief deposits of metal, however, occur on and around the sandstone hill lying about a mile west of the Thumbs outcrop of serpentine, where it had been carried by freshets into gullies and streams. In this locality the osmiridium is very unevenly distributed, claims from which a quantity of metal was won often abutting on others which did not even return their owners a bread and butter wage. On one claim it was often possible to pull up a tussock of button-grass and wash four or five grains of metal out of the mud adhering to the roots; while a yard or so further on, metal could only be found in the "pug" and sandstone wash at a depth of anywhere from five to eight feet.

The foregoing is illustrative of the capricious occurrence of osmiridium all over the field. No one knew where it was to be found; sometimes it would be discovered in very recent organic deposits, an inch or so underground, while in other cases it would dip right down into the old clays and sandstones under anything up to twenty feet of overburden, and all within a radius of perhaps 100 yards. And in this radius, too, it might disappear altogether. Mining, therefore, was more a matter of luck than judgment, and the newchum digger often did much better than the old and experienced miner from the north-western fields. The former usually pegged in a most unlikely spot, striking good metal right away; while the latter, keeping to his preconceived notions acquired on the Savage and Whyte Rivers, would go fossicking round the fringe of the serpentine belt, and discover nothing of value.

As yet, osmiridium has not been found to exist in payable quantities in the serpentine rocks at Adams River or elsewhere, and it is doubtful whether it ever will be. The only rock-crushing show the writer knew of, was one in the northwest of the Island, and after some little initial success it was reported to be a complete "washout". The fact is that osmiridium occurs in isolated **schlieren,** throughout serpentine. It would, therefore, be difficult to fix on a patch worth treating. The "free" osmiridium found in the alluvial and detrital deposits in the field today probably represents the accumulations eroded from millions of tons of serpentinous rock now non-existant.

The methods for the recovery of osmiridium at Adams River are similar to those in most other alluvial fields worked

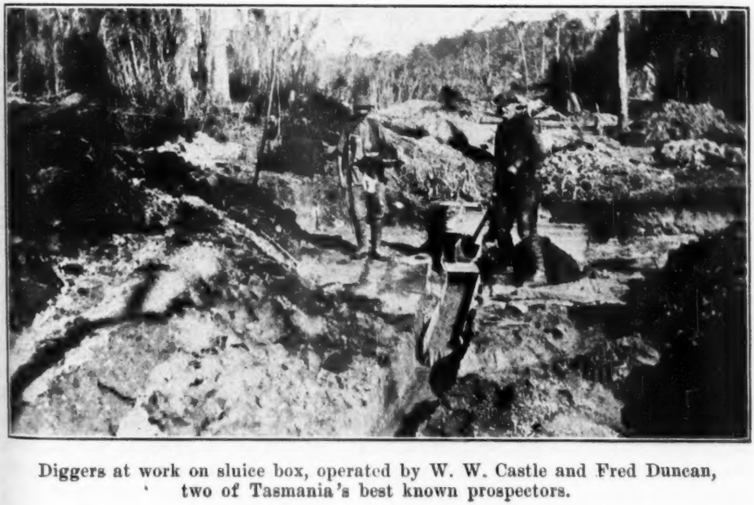
Pulping up "pug" in puddle box prior to putting through sluice.

by individual diggers. As there is usually an ample supply of water in the district, owing to the heavy rainfall (120 inches per annum), sluicing is one of the favorite methods in vogue. Most of the claims are of the "one-man" variety, and sluice-boxes are consequently small. Seldom more than a few tons of dirt are put through in a day. After the stones are forked out and the mud and gravel carried away by the "head" of running water, the osmiridium (if any) is found concentrated with black chromite sands at the bottom of the sluice box. It is separated from this sand by the ancient method of panning-off in tin prospecting dishes. In "puggy" (cheesy) ground, the dirt is usually pulped up by foot in a puddle-box (usually a rough trough hewn from the trunk of a tree) so as to permit of its successful treatment in the sluice-box. Were this not done, the metal would be carried off with the cheesy lumps of clay. One party of diggers installed a horse puddling mill on their claims which operated with marked success, making it possible for them to put as much dirt through in a day as they had hitherto treated in a week.

Other methods used for the recovery of osmiridium are ground-sluicing, hoppering, and cradling, the one employed varying with the nature of the dirt to be treated and the amount of water available for washing purposes. The area allowed to one man under the State Mining Act is 50 square yards.

Although there were no large fortunes made on the field, several men cleared quite comfortable sums in the beginning. The price paid them by local buyers was £32.15s. an ounce, which handsomely repaid men with good claims. These often returned their lucky owners anywhere from £40 to £200 a week. Some claims even yielded up to 10 ounces of metal daily over extended periods. On the other hand there were hundreds of men who could not make a living at the game.

The Adams River field has now seen its hey-day, and the output is at the most not more than a few ounces a week, perhaps not even this. The total area was not large, and being of a shallow and comparatively easily-worked nature, it was not long before it was depleted of its main supplies of metal. But the field will remain a fossicker's one for many a long year yet. There are odd pockets still to be found and tailing dumps and imper-



Diggers at work on sluice box, operated by W. W. Castle and Fred Duncan, two of Tasmania's best known prospectors.

(Hansen Bros. and Kingston's claim) horse-operated puddling mill at Adams River diggings. This claim was the richest on the field, sometimes yielding over 10 oz. a day for long periods.

fectly worked old claims will provide many a "scratcher" with a modest crust and an interest in life if the price of the metal remains high.

Practically all the osmiridium obtained in Tasmania is of the rare "point" variety so much sought for by manufacturers of fountain pens, and containing such a high iridium content as it does, it will always command a ready sale. Osmiridium and its components have a wide and increasing use in commerce and the arts, but space prevents touching on this side of the subject here.

Much valuable and interesting information regarding the occurrence, distribution, and mineralogy of osmiridium is contained in Mr. A. McIntosh Reid's work: "Osmiridium in Tasmania", issued by Tasmanian Mines Department, 1921. This book is the most important contribution yet made to the only too limited bibliography dealing with osmiridium.

And if you want to see a speck of osmiridium, just examine the writing tip of your fountain pen. If it is a good pen, a trusty pen, a smooth-writing pen, you can just bet that the tiny glistening white speck embedded there in the yellow gold, hails from the romantic osmiridium fields of Tasmania.

Photographs by the Author.

Editor's Note:—Mr. Lennon, a prospector, miner and writer, will prepare for future issues of Rocks and Minerals articles on prospecting, mining and geology and will cover many of the out-of the-way places of the world. He has traveled extensively, since age of 14, through India, Ceylon, Burma, Malaya, Java, the South Seas, Australia, Tasmania, South Africa, Egypt, and most of Europe. He was the only writer to take in the osmiridium "rush" from start to finish as well as being the only newspaper man on the scene. We are sure our readers will enjoy Mr. Lennon's articles.

Attention of Mineral Collectors

The Mineralogical Society of America is attempting to compile a list of the more important mineral collections, both public and private, in the United States and Canada, the intention being to publish this information in the form of a regional Directory in the **American Mineralogist.**

While the securing of the necessary data relating to the larger public collections housed in Museums and other institutions presents little difficulty, the task of collecting information upon the smaller private collections, either general or specialized, that exist on this continent is more formidable. It is believed that there probably exists, in various smaller centers and mining districts, a wealth of interesting and valuable mineralogical material, some of it possibly collected years ago and from localities no longer accessible, which is virtually unknown to the scientific world. It is of decided value and interest to the owners of such material that the existence of their collections should be recorded, both from the standpoint of the possible scientific value of the material and with a view of enabling the owners to establish contacts with mineralogists who may find themselves in their districts and desire to examine the collections.

Accordingly, the Mineralogical Society of America wishes to ask all readers of this announcement who may be mineral collectors, and who own either general or specialized collections, to kindly send their names and addresses, together with a brief note on the nature of their material, to the address given below. If the collection is specially rich in minerals of a particular mine, locality or district, this should be mentioned, as should also the inclusion of any specialized types, such as gems, meteorites or other notable rarities.

In the case of public collections, the name of the Institution together with the name and address of the custodian or director, are desired.

In addition, the Society would welcome information, with notes as above, regarding other collections known to the correspondents, and which they consider should be included in the Directory.

Details relating to collections consisting wholly of the minerals and ores of an individual mine, and on permanent exhibit at the mine office, will also be welcomed from mine owners, managers, superintendents, and engineers. The names and addresses of small local dealers specializing in the minerals of particular localities will also be of interest.

Since the success of the survey being made will very largely depend upon the co-operation of those individuals in possession of this information an earnest appeal is made for as full, complete and prompt replies as possible. Address all correspondence to **Samuel G. Gordon, Philadelphia Academy of Natural Sciences, Logan Square, Philadelphia, Pa.**

Considerable interest is being manifested in a small vein of azurite and malachite located about one-half mile from the County Center Building, White Plains, N. Y., which was uncovered during road construction. The vein was discovered by L. R. Stuffler, Superintendent of Construction, of the Westchester County Park Commission, Bronxville, N. Y., and to whom we are indebted for this announcement.

One of our subscribers, a geologist, has examined the deposit and we hope to print in the next issue an article on this.

Canada has within her borders extensive deposits of high grade gypsum and some of these have been operated for many years; in fact the discovery of gypsum in Nova Scotia was the first in North America.

The highest and lowest points in the United States are both in California—Mount Whitney, 14,496 feet above sea leve, and Death Valley, 276 feet below sea level. These two points are only 86 miles apart.

Beryllium in Maine

—— By ——

PROF. FREEMAN F. BURR, Geologist

Head of the Dep't. of Geology at St. Lawrence University, Canton, N. Y.
Former State Geologist of Maine,
Honorary Member of the Maine Mineralogical and Geological Society.

Many metals which have been known for a long time, but which have, until recently, been considered as having interest only for chemists and mineralogists, are coming into use in response to the ever varying demands of rapidly developing modern industry. In some cases the metals have value in themselves, but more often they force themselves upon our attention because of valuable qualities which are developed when they are alloyed, in small quantities, with some of the better known and more widely used metals such as iron, copper and aluminum.

Beryllium is one of these. The metal was detected as long ago as 1797, by Vauquelin, in the mineral beryl; and in 1828 the pure metal was obtained by Bussy and Woehler. For a century the metal remained unnoticed, except as a chemical curiosity; and for the most of this time it does not appear that commercial uses were even suggested. Recent developments, however, particularly in the electric industries and in aviation, have brought about demands for metals which will meet more exacting conditions; and beryllium has received attention which may, in all probability will, lead to its use in fairly large quantities in the near future.

The uses of a metal are determined by its physical characteristics, either in a pure state, or as one of the components of an alloy. Beryllium is a hard, brittle metal, dark gray in color, and capable of taking a fair polish. Its tensile strength is greater than that of aluminum, and its specific gravity is only 1.85, which makes it about 30% lighter than that metal. An alloy which contains up to 5% beryllium has a higher melting point than that of pure aluminum, acts better in castings, is stronger and machines better. As small a quantity as 1% beryllium has been found to impart highly desirable characteristics.

The metal beryllium occurs in nature as a more or less important component of some twenty minerals, mostly rather complex silicates. These minerals are found, for the most part, in those highly interesting rocks known as pegmatities, or giant granites; although beryl and a few of the others may occasionally appear in such metamorphic rocks as slate and mica schist. Beryl is the only one of them that is likely to be found in wide enough distribution, or in sufficient concentration, to receive serious consideration as an ore of the metal.

Seven of the beryllium minerals are known to occur in the pegmatites of Maine, as follows:—Bertrandite (hydrous beryllium silicate); beryl (beryllium aluminum silicate); beryllonite (sodium beryllium phosphate); chrysoberyl (beryllium aluminate); hamlinite (beryllium aluminum phosphate); herderite (calcium beryllium fluor-phosphate); and phenacite (beryllium silicate). The list is doubtless incomplete; and it is highly probable that some of the others are in progress of identification as this paper is being written. Most of the minerals named are quite rare, and none except beryl may be said to occur widely or in large quantity.

So far as the Maine minerals are concerned, the content of beryllium metal varies from a little over 5% in beryl to 16.4% in phenacite. These figures refer, of course, to ideal compositions of pure minerals; since, however, minerals seldom, if ever, occur absolutely pure, the tenor of metal must, in a given case, be reckoned at a lower figure. Furthermore, it should be noted that at the best the beryllium minerals constitute only a small portion of the rock in which they occur, so that the run-of-the-ledge yield of beryllium will never be more than a small fraction of one percent. On the other hand, beryl commonly occurs in relatively large and distinct crystalliza-

tions, easily recognizable, and readily separable from the associated minerals: concentration should be neither difficult nor expensive.

Beryl occurs commonly in well-formed hexagonal crystals with flat terminations; ranging in length from less than an inch to sixteen feet or more, and in diameter from a fraction of an inch to several feet. Giant crystals, such as those found recently in the town of Albany, are not common; but crystalline masses approach-these in size have been uncovered occasionally, notably at Mount Apatite, in Auburn, and in southern New Hampshire. In color, the mineral ranges from white through various shades of green, blue yellow and pink, the green shades being the commonest. Water clear beryl, suitable for gems, is comparatively rare; most of the crystals are either opaque or dimly translucent. Gem beryl is likely to take rather imperfect crystal form, although this is by no means constant.

Beryl is a more or less important constituent of the pegmatites (sometimes known as feldspar rocks) in at least thirty localities (probably many more) in Androscoggin, Cumberland, Kennebec, Oxford, Sagadahoc and York Counties. Obviously, the total quantity is large: it is equally obvious that nothing like a definite estimate can be made until a thorough investigation has been carried out: common sense would seem to indicate the desirability of such an investigation.

In 1922, a small quantity of beryllium metal is said to have been sold at the rate of $5,000 a pound: in 1929, a quotation of $50 per pound was noted, although that on hand at present appears to be held at a considerably higher figue. Such a sharp reduction is probably due chiefly to two things:—first, improvement in the technique of extraction; second, the fact that beryllium is leaving the class of chemical curiosities and entering that of commercial metals. Because its only likely ore is a silicate, the extraction of beryllium will always present technical difficulties; and it is hardly to be expected that this metal will reach a price level comparable to that of aluminum, for example. If, as seems to be indicated, the demand is for relatively small quantities to be used as a minor alloyant, then a reasonably high price will be no bar. Some of the large metal companies are beginning to show a willingness, if not an eagerness, to use beryllium provided it can be obtained steadily in sufficient quantity, and at a price not too extravagant.

In Maine we should find out, without delay, how much beryl we have, where the most favorable deposits are located, and how we can get it out in quantity at the lowest possible cost. If we can work out, and apply, within the State, a method of extraction in sufficient quantity at reasonably low cost, so much the better for us.

MINERAL LOCALITIES INFORMATION DEPARTMENT

Members desiring information regarding minerals or mineral localities in the following states may obtain it by writing to the Collectors listed and enclosing a self-addressed stamped envelope.

Oregon, Southern Idaho, Northern Nevada	Dr. Henry C. Dake, 793½ Thurman Street, Portland, Ore.
The Oregon Coast, South and Western Oregon, Northern California, Southern Washington	John M. Tracy, 601 Orange Street, Portland, Ore.
Petrological Information in Central Eastern Iowa	Prof. Wm. J. H. Knappe, Curator, Wartburg College Museum, Clinton, Iowa.

The Geology of the Hutchinson Valley Sanitary Sewer Tunnel

—— By ——

THOMAS W. FLUHR, A. B., A. M.

Photographs by the Author

The Hutchinson Valley Sanitary Sewer Tunnel is one of the projects undertaken by the Westchester County Sanitary Sewer Commission, in their attempts to serve the needs of this rapidly growing area. The work has been carried on under the supervision of Mr. W. W. Young, Consulting Engineer, and the plans of the tunnel drawn up by Project Engineer Frederick C. Ziegler.

The tunnel is to be six and one half feet in diameter when finished, and about two miles long. It begins at the eastern side of Mt. Vernon, runs west to the Yonkers line, and then south thru Yonkers almost to the New York City boundary, where it connects with a tunnel already constructed, which runs westward thru Yonkers to the Hudson River.

The MacQuesten Parkway shaft of the Hutchinson Valley Sanitary Sewer Tunnel during construction.

The tunnel cuts directly across three of the geological formations of the region, as well as thru two buried stream channels. The buried channels and associated crush zones have added greatly to the difficulties of the work, and because of these difficulties, and because the information gathered from this project may be of use in possible future projects in the area, a description of the geology is of value.

In order to appreciate the geological situation in the area crossed by the tunnel it is essential to get some sort of a picture of the formations encountered, and of what has happened to them in the past.

The three earlier formations in this area are all Pre-Cambrian in age, very old rocks. These are the Fordham gneiss, the Inwood limestone, and the Manhattan schist. A formation much younger than these is the glacial drift.

The Fordham gneiss is, according to Professor C. P. Berkey, (**Structural and Stratigraphic Features of the Basal Gneisses of the Highlands**, New York State Museum Bulletin No. 107, 1907), a

The eastern portal of the Hutchinson Valley Sanitary Sewer Tunnel during construction.

member of the Grenville series. It is a black and white banded quartzose gneiss, schistose in places, and very complex in its makeup. The thickness of the gneiss is unknown.

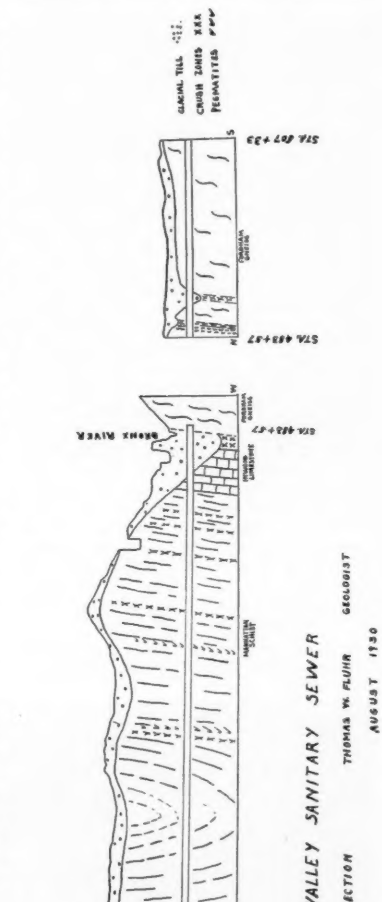
The Inwood limestone is a coarsely crystalline, rather massive dolomite, carrying some mica and occasional quartzose layers. In places there are schistose layers. Its approximate thickness is about 700 feet, but varies in different localities from 600 to 1000 feet. It is believed to be conformable with the gneisses below it, but this has never definitely been settled.

Above the limestone and conformable with it is the Manhattan schist. This is a recrystallized sediment, made up of quartz, mica, and garnet, and is strongly foliated. Its thickness has never been determined accurately, but is probably several thousand feet.

These three formations have all been compressed into folds which have northeast-southwest axes, and have then been eroded. On top of the eroded edges of the older formations have been laid down the glacial deposits. In this area these consist mostly of stratified or partly stratified gravel, sand, and clay, with some deposits of unassorted glacial till.

The history of the area of importance to this project begins at the time of Appalachian mountain-making, when the older formations were folded up into the northeast-southwest folds. Later, in Cretaceous time the area was cut down by stream erosion so that a peneplane was formed. The ridges and hills were cut down so that they stood not much above sea level. The present ridges and valleys did not exist at that time. In this period of peneplanation the rivers formed great alluvial flood plains over which they flowed.

After this period of erosion and peneplanation came a time of continental elevation. The rivers cut down thru their alluvial plains to bed rock. The smaller streams adjusted their courses to the rock structure so that they flowed along the softer and weaker beds. The larger streams, cutting their channels faster, were able to cut across discordant rock structures, and to maintain their original courses. The Bronx River seems to have had a rather complex history, for in its upper part it follows the weaker beds (the limestone), but in its lower course cuts directly across a ridge of gneiss. In



Tertiary time another peneplane was in process of being formed, but in late Tertiary time the land was again elevated, and the streams then cut down narrow gorges in their valleys. These gorges now lie deep below the present stream valleys.

In Pleistocene time glacial deposits were laid down over the area, covering the bed-rock in an uneven layer. These deposits filled up the gorges and buried the old channels. As a result the present streams often flow thru their old valleys on beds of glacial drift, and their present courses do not follow exactly the courses of the old gorges in bed-rock thru which the streams once flowed. The Bronx River at Mount Vernon displays this characteristic. Its present course is in the glacial drift, but below the drift and buried in it, is an old preglacial channel.

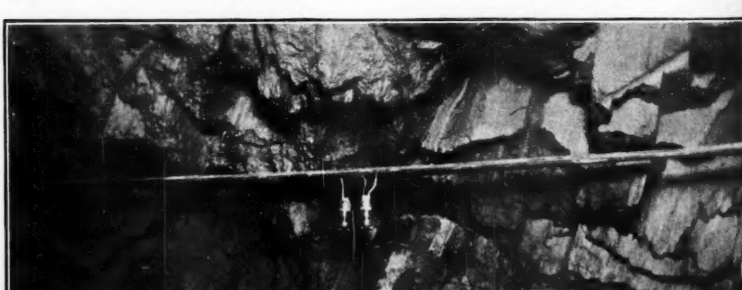
Evidence of borings which have been made in the region leads to the belief that the location of the old buried channel was determined not alone by the erosion of the softer limestone, but by a crush zone caused by faulting of the limestone against the Fordham gneiss. Besides this large crush zone, a cross fault and crush zone are present in the Fordham gneiss itself, and this too has led to the formation of a buried gorge.

Both of these crush zones and buried gorges are illustrated by the accompanying geologic cross-section. The exact depth of the old gorge of the Bronx River at this point is not known.

The effect of stream adjustment to the weaker beds is displayed by the old Bronx River, and by the preglacial stream which flowed along the Hutchinson Valley. In both cases the streams followed the weaker limestone, and as a result there remains a ridge of gneiss on one side of the valley and of schist on the other. In the case of the Bronx River a further complication arises because of faulting, which has produced a crush zone at the contact of the limestone and the gneiss. When the area was elevated during preglacial time, this crush zone permitted the old Bronx River to cut down a deep gorge along the course of the crush zone. Not only that, but the elevation allowed the circulation of water thru the broken material of the crush zone, and this resulted in decay of the rock in the crush zone to a considerable depth.

Even a crush zone can be crossed without much difficulty in tunneling if it is cut at such a depth that the rock is not decayed. Decayed rock means that the decayed material will run into the tunnel, and also permit the infiltration of ground water, and these mean added support for the roof, and a wet tunnel.

In the case of the Hutchinson Valley



This picture gives evidence of rock movements which have taken place. This is in Manhattan schist.

This picture illustrates one of the smaller fault zones in the Manhattan schist, showing fault gouge and broken rock which have fallen into the tunnel.

Sewer Tunnel, engineering considerations made it necessary to construct the tunnel at a shallow depth. This meant penetrating not only crushed and decayed rock, but also the actual gorges of the old streams, now filled with sand, gravel, and boulders. The difficulty of carrying on the work was much enhanced by these features.

The lesson to be learned from this is that in an area such as this, it is better, when engineering considerations permit, to carry on tunneling operations at such a depth that old stream valleys will not be encountered, and that crush zones will be cut at a depth below the zone of decay. It is advisable also to carry on exploration with the geological features of the area in mind, so as to avoid the weaker zones as much as possible.

Acknowledgement is due Mr. W. W. Young of the Westchester County Sanitary Sewer Commission for his kindness in allowing this study of the Hutchinson Valley Sewer Tunnel to be made, and to Messrs. Gardiner and Freeman, representatives of the contractors, S. J. Groves & Son, for the assistance they rendered in facilitating the work.

ROCKS AND MINERALS would be pleased to receive as loans, photos of all or any of the following mineral localities or minerals found there: Joplin, Mo.; Paterson, Bergen Hill and Franklin, N. J.; Bisbee, Ariz.; San Diego County, Calif.; Nova Scotia, and Provinces of Ontario and Quebec, Canada; Chihuahua, Mexico; Minas Geraes, Brazil; Tsumeb, Africa; Nizhni Tagilsk, Urals; and Poonah, India.

These photos are to illustrate an article which will appear in the June issue of ROCKS AND MINERALS and they will be returned to their owners as soon as we are through with them.

Pumice is usually found in solid coherent masses which are generally white or light gray in color, says Dr. Oliver Bowles in the Bureau of Mines report "Abrasive Materials in 1929," recently published. It occurs in the vicinity of active or extinct volcanoes and consists of extremely porous glassy lava which has been forced out by the sudden expansion of gases inclosed in the molten magma. When dry the blocks are so porous that they will float on water.

Pumicite, also known as volcanic dust or volcanic ash, consists of small, sharp, angular grains of volcanic glass.

Are the Colors of Precious Stones Due to Colloids?

—— *By* ——

GEORGE O. WILD,

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Until recently the colloid viewpoint of Doelter-Vienna was almost universally accepted and hardly ever questioned. The conclusions of Doelter were drawn from experiments with X-rays and radium; methods and results were inexact. (Doelter: **Das Radium und die Farben**).

Liesegang, who is quite famous as the originator of the theory explaining the structure of agates, and the writer, questioned the colloidal theory of Doelter in 1923 but in the meantime we have modified our standpoint in the matter. The problem is an open one at the present time, especially as the experimental work along these lines is lacking. The ultramicroscope (specially built for solids by the well-known firm of Zeiss of Jena) has not revealed any traces of ultra microns and where centers of diffraction have been observed it remains doubtful whether these are due to the pigmenting bodies; it seems that it is not the case. Funds are completely lacking to carry on research in this field.

The spectroscopic investigations conducted by the writer at The Institute for Precious Stone Research, Idar, Germany, (now practically closed) have revealed that the colors are due to metallic additions to the molecular structure of the precious stones. The pigmenting elements detected are situated between the numbers 22 and 32 of the periodic system of the elements, chromium being the element most encountered. The word chromium depicts color and it is making good its reputation in connection with precious stones. It colors the ruby, emerald, precious topaz, euclase, hiddenite, garnet and others. Its neighbor in the periodic system is vanadium; both elements appear associated quite often and it seems that at times the colors are due to both elements in conjunction. In molecular solution (as is the case with ruby) chromium produces a red color and emits a deep reddish fluorescence under the influence of ultra violet rays. There are two very sharp absorption lines in the red part of the spectrum of white light and these lines coincide with two red rays emitted when the stone is excited by ultra-violet lights or by x-rays; it may therefore be concluded that the chromium is present in molecular solution or molecular dispersion.

Such convincing conclusions cannot be drawn in connection with all the other precious stones but future research will no doubt establish connections between the light waves absorbed and emitted. In the last issue of this magazine the writer has published an article on the color of amethyst. In the meantime another article by the writer appeared in the **Centralblatt f. Mineralogie** and it deals with the ultra-violet absorption spectrum of various quartzes. The curves obtained sustain the author's contention that the color of amethyst is due to a splitting of the lithium and sodium silicate molecules and the silicon, sodium and lithium ions are clogged together between the left and right hand lamellae of the amethyst; here the phenomenon may be a colloidal one as we have a number of atoms in a bunch and not single atoms, as we probably have with smoky quartz where the silicate is also split; but in this case the silicon ions (charged atoms) do not have a chance to move and get together in bunches as there are no interfaces due to twinning as is the case with amethyst. This explains why the purple color of the amethyst cannot be produced by radiation in colorless quartz, but can only be regenerated after amethysts have been heated to the colorless state. A subse-

quent treatment with x-rays allows the atoms to clog again between the lamallae which are far apart from one another as compared with the size of the atoms.

Where the color is due to isomorphous replacements as with rubies, emeralds, tourmalines (green), etc., it is very stable against the influence of heat, radiation, etc. But where the color originates from more complicated affiliations it is not stable as with quartzes, precious topaz, pink tourmaline, Ceylon sapphires, etc.

Doelter has differentiated between allochromatic and idiochromatic colors, the last being those inherent to the stone. This classification does not hold good as all precious stones are known in the colorless state; where there is a seeming exception (garnet, peridot) the molecule is however colorless and only the variation used as a precious stone is seemingly idiochromatic. The colors due to the foreign additions are partly stable and partly labil. Some can be changed by heat and the resulting new colors are stable. All changes produced by radiation are labil and can be reversed by visible light or even slight heat (200-250°C). Where radiation effects however a reversal of lost natural color as with amethysts, pink tourmalines, etc., the regenerated color is again stable. Such regeneration can be obtained by a treatment with X-rays within an hour or two; in the writer's laboratory 200 Kilo-volts were used with 2-4 Milliamperes and effects could be noticed within several minutes.

It would be interesting to find precious stones in the colorless state but with additional metallic bodies which would ordinarily produce colors. The few tentative experiments made by the writer along these lines proved that there seem to be no stones which carry i. e. chromium, without exhibiting a slight color. The spectrum photographs show always a diminishing number of lines of a fading intensity when series were examined, arranged according to color. The colorless pieces were always found to have no traces of the pigmenting metals. These finds are however not conclusive.

Micro Mineral Collecting---An Appeal!

— By —

ERNEST M. SKEA,

Box 46, Pilgrim's Rest, Transvaal, South Africa

Has it occurred to collectors of cabinet specimens that very often the chips or fragments resulting from the breaking and trimming of large size samples are frequently just the items that would be welcome to the collector of microscopic minerals? I do not refer to minerals of the massive type, but to those that exhibit tiny crystals, plates, balls, hairy tuffs, radiations, etc., either in or on the matrix. Of course, a hand lens is needed more often than not to examine either one or more of these features in a specimen.

I daresay many collectors and dealers look upon such fragmentary stuff as worthless, but the micro enthusiast thinks otherwise and is willing to pay a reasonable price for a choice little specimen of the "rubbish". What sizes? Well, pinhead to less than one inch, if you like! The pin-head size would represent a single crystal—or two, perhaps.

Many micro collectors have cabinet collections also, but for real beauty and interest the micro-mounts when studied under the binocular microscope cannot be beaten. It is a veritable Fairyland.

It would be a step in the right direction if those readers who are micro collectors could work up an exchange with each other and thereby enlarge and improve their collections, for I am sure that there must be others besides the writer living in the "Back o' Beyond", micro-mineralogically speaking. A little Ad in **Rocks and Minerals** should do the trick.

Field Museum Notes and News Items

Contributed by

THE FIELD MUSEUM OF NATURAL HISTORY

Chicago, Ill.

"Volcanic bombs" or lumps of lava which have cooled while traveling through the air after being hurled forth in an eruption, are now on exhibition in the Department of Geology at the Museum. They were collected by a recent expedition to the Mount Taylor volcanic region of New Mexico.

Mr. Stanley Field was re-elected President of the Field Museum of Natural History for the twenty-third time at the annual meeting of the Board of Trustees of the Institution held on Monday, January 19. Mr. Field has been President since 1909.

A large collection of pseudomorphic minerals—that is, minerals which by substitution or alteration assume the forms of other species—is on exhibition in the Department of Geology at the Museum.

Two magnificent and highly valuable gem specimens, one of them pronounced by experts the largest and finest of its kind in the world, have been presented to the Museum by R. T. Crane, Jr., it was announced on January 8th by the Museum Director, Stephen C. Sims.

The stone which has no equal of its kind is of the variety of topaz known variously as "rose topaz", "royal topaz" and "Brazilian ruby." It is of deep table cut about one and one-quarter inches long and three-fourths of an inch wide, and weighs 96 carats.

The other is a superb specimen of black opal in the form of a plaque about two and one-half inches long and two inches wide.

These gems were added to the exhibits of gems and jewels in H. N. Higinbotham Hall of the Museum.

The topaz is a rich red in color, and is perfectly transparent. According to Dr. Oliver C. Farrington, Curator of Geology at the Museum, and noted authority on gems and jewels who has written several books on the subject, topaz of this color is found only in Brazil, and its occurrence in any large and transparent form is extremely rare. While topazes of gold, yellow and light blue color are comparatively common, this rose variety is seldom seen and is highly prized by connoisseurs. When found, it occurs as crystals usually longer than broad, but the majority of these are pervaded by cracks and flaws which make them unsuitable for cutting. The specimen now at the Museum is believed to be the largest flawless one ever obtained.

The large black opal plaque has a surface stippled all over with minute brilliant colors which change uniformly to other tints as the stone is seen from different angles.

Fossil scales of the earliest known fishes, from the Ordovician period, about 590,000,000 years ago, are on exhibition in the Department of Geology at the Museum.

A series of specimens illustrating various stages in the formation of peat is on exhibition in the Department of Geology at the Museum. The specimens were obtained from peat bogs in the State of Illinois.

A model of typical subterranean strata of the Chicago area, illustrating the relation of soil to rock in this region, is on exhibition in the Department of Geology at the Museum. As this is a glaciated territory there is a sharp separation. The continental glacier removed the original

soil and scoured the surface of the rock. As the present soil was deposited by the melting of the glacier, the contour of its surface is quite independent of the peaks and valleys of the underlying rock.

A large collection of the curious forms of rocks, clays and sands known as concretions, is on exhibition in the Department of Geology at the Museum. Many look almost like intentionally sculptured representations of familiar objects.

"How long is it since mastodons and mammoths lived in and around what is now Chicago?" is a question often asked of the geologists at the Museum.

"Only about ten thousand years," is the estimate ventured by Prof. Elmer S. Riggs, Associate Curator of Paleontology.

It is believed that the ice sheet finally disappeared from the "Wisconsin area" (including the site of Chicago) some twenty thousand years ago, according to Prof. Riggs. The bones of mastodons and mammoths are found in bogs and small lakes which were formed after the ice had melted away, he says. Mastodon and mammoth bones now in the Museum which were excavated near Minooka, Illinois, came from the gravels around a spring left there by the melting glacial ice. The animals had apparently come there for a drink, became mired in the bog around the spring, and unable to extricate themselves had sunk to their death at its bottom.

"A mastodon skull which the Museum obtained at Yorkville, Illinois, came from black muck only 18 inches below the surface, which would indicate that a comparatively short length of time, geologically speaking, had elapsed for the remains of the animal to be covered to that depth," says Prof. Riggs. "So, from this and many other evidences, it seems to be a safe conclusion that mastodons and mammoths lived in the Chicago area as late as ten thousand years ago.

One eminent authority believes that the mostodon lived in North America after the coming of the American Indian, and that the red man doubtless had a hand in exterminating them. This conclusion is largely based on apparent probabilities. Nobody knows when the first Indian came to the Chicago region, or how long they lived there. They had among them so far as is known, no traditions of these animals. They left no implements in America carved of mastodon bones or ivory, such as they found in the old world. They left no carvings or picture writings of these animals such as decorate the cave-dwellings of primitive men of western Europe. Therefore we have no evidence that the mastodon or mammoth were ever hunted, or that they were known to any race of primitive man about Chicago.

We do know from abundant evidence that both these races of extinct elephants were very common throughout North America; that the mastodon came first and that his race was well established here some millions of years ago. We know also that the mammoth came later, from Asia; that both lived throughout the greater part of what is now the United States; and that both races died out on this continent after the ice had melted in this latitude. The region about the southern end of Lake Michigan is one where fossil remains are most abundant. Therefore it may be said with full assurance that these elephants roamed about Chicago only a few thousand years ago."

The origin and uses of jet or "black amber" are explained by an exhibition in the Department or Geology at the Museum.

Fossils of worms which lived in the Chicago area some 390,000,000 years ago (in the Silurian Age) have been collected for the Museum by Bryan Patterson of the Department of Geology. They are found in rock in a limited area along the Sag Canal about a mile southwest of Blue Island, Ill.

"Worms, being soft-bodied creatures, are comparatively rare as fossils, and usually the only traces of them are their burrows and tracks," reports Mr. Patterson. "To find them in abundance, pressed flat between layers of a shaly rock and preserved as a thin sheet of carbonaceous matter, as was the case in this near-by Chicago locality, is indeed a rare thing."

In addition to the worms, which were by far the most common fossils of the locality, a few associated fossils of animals known as brachiopods and graptolites were encountered, and also traces of prehistoric algae or minute plants.

The Pegmatites near Gilsum, N. H.

—By—

DAVID MODELL,

Harvard University, Cambridge, Mass.

The village of Gilsum, New Hampshire, lies in the south central part of the state, about twenty-five miles north of the Massachusetts border. The occurrence of a group of pegmatite workings within a ten mile radius of this village provides the locality with interest for mineralogists.

In company with two friends, Dr. and Mrs. H. J. Swann of Brooklyn, New York, I devoted two days in the early part of August to a reconnaisance mineral collecting trip in this vicinity, visiting as many quarries as possible, and occasionally taking brief notes. For information regarding a possible itinerary, previous to making the trip, I have to thank Mr. E. K. Gedney of Harvard University.

Because there seems to be no account of this occurrence readily accessible, I have assembled some of my notes into the form of this article, in hope of its proving of interest to others, who, like myself, are amateurs of minerals and mineral collecting. Some general remarks on the geology and economics of the pegmatites are followed by a series of short commentaries on seven of the eight pegmatite bodies that were visited. The accompanying sketch map will serve to give approximate locations.

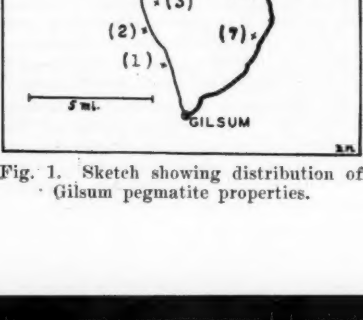


Fig. 1. Sketch showing distribution of Gilsum pegmatite properties.

The bedrock in the immediate vicinity of Gilsum is a ferruginous biotite mica schist—said to be fibrolitic in places—which has been lit-par-lit injected by a two-mica granite; this granite, it may be noted in passing, resembles an adamellite (quartz monzonite) occurring further north, in the Belknap Mountains, which similarly injects a biotite schist.

Where injection has been intense, there results an igneous gneiss, of almost the same mineralogic composition as the granite, but with planes of foliation which parallel those of the original schist. The determination of the process whereby an injection of this type takes place is one of the difficult problems confronting petrologists.

Dikes and lenses of pegmatite intrude this schist-gneiss complex without any particular regard to direction, and, generally with sharp contacts. Some of the pegmatites contain engulfed blocks of schist, and once or twice the end of such a block was seen to gradually taper off, suggestive of a partially stoped roof pendant.

The form and position of the pegmatite bodies suggest that they were intruded under high pressure; probably at a time when the temperature of the surrounding rock approximated their own. The temperature of pegmatites is thought to be $\pm 575°$ C.

The Yuhas mine appears to demonstrate that at least one period of pegmatite activity was post the lit-par-lit injection stage, since the lens at this location may be seen to cut across the granite-gneiss; whether any phases were earlier, I did not have an opportunity to determine. The pegmatites are perhaps most safely regarded as an after effect of the lit-par-lit injection, coming from the same magma reservoirs that give rise to the intrusive granite.

The occurrence of these pegmatite

bodies seems to have been known before 1877. Charles Hitchcock, in his detailed three volume work on the "Geology of New Hampshire," published in 1877, writes of "very coarse granite veins" in this area. Altho "pegmatite" had been proposed by Hauy, previous to 1822, as a designation for "very coarse granite veins", it would seem not to have been in general use at the time of the Hitchcock survey.

Hauy formed the word from the Greek root "pegma", a framework, thereby referring to the graphic intergrowths of quartz and feldspar frequently found in these bodies. If this ever be lost track of, in the future, there is the possibility that philologists will wrongly derive the word from the Greek for "showy", which also is "pegma"; this derivation is at least as apt as the original, in view of the beauty and spectacular character of pegmatite minerals.

The Gilsum pegmatites are quarried either for potash feldspar, muscovite mica, or both. The feldspar is ground at nearby crushing mills, and shipped to New Jersey, to be used there as raw material in the ceramic industries. Of the mica obtained, much is unsuited for use as transparencies; this is then distributed to numerous industries (a few are mentioned below) to be employed in a miscellany of minor uses:

Wall paper.

Automobile (as the white coating of tires.

Electrical Insulation.

Rubber (as an abrasive in pencil erasers.)

The mines are, for the most part, operated by companies who lease the pegmatites from farmers. We were informed, in one particular case, that the farmer received fifty cents for each ton of feldspar removed from his property; if the lens was a good one, this became a very satisfactory source of revenue.

The market price of the feldspar was given as varying from seven to nine dollars per ton, depending on the grade.

French Mine (1)

Worked for mica.

The pit is an S shaped trench, 140 feet deep, which follows the trend of the pegmatite lens. The enclosing mica schist contains abundantly distributed black tourmaline crystals, small in size, but with good crystal development. A coarse intergrowth of quartz and feldspar, with some schorl makes up the main body of the pegmatite.

Photo by author

Fig. 2. French Mine. Note men at work in the shade. Picture taken from top, looking 140 feet down.

A noteworthy pseudomorph of quartz after muscovite was picked up on the dump; it distinctly showed the macroscopic features of the replaced muscovite, even to cleavage traces.

The method of mining consists of blasting a face, and then hand picking the ensuing rubble for mica. Figure 2 was snapped from an overhanging ledge at the top of the trench. The stage of handpicking is in progress.

Golding-Keene Mine (2)

Worked chiefly for feldspar.

This is the largest of the pegmatite workings, and is indeed an impressive gash. In shape, it is a roughly circular pit, 240 feet deep, and 100 feet in diameter. We made our way to the bottom by means of a series of rude ladders which rested against perpendicular walls and outjutting ledges. At the bottom, we entered the large gallery which had been hewn into the north face, and found the roof supported by very large, massive columns of graphic granite. These columns, embellished by nature with the ornamental and highly decorative patterns of the quartz-feldspar eutectic—aptly called by someone "ordered irregularity" — we found very beautiful. It immediately suggested to us that the value of graphic granite as an expensive building stone for special effects is perhaps being overlooked. To our mind it is quite as interesting a stone as, say, travertine.

The feldspar mined has a high potash content. Beryl crystals do not occur abundantly; those few that were found, however, have transparent interiors almost of gem quality. The color is pale aquamarine green.

Britten Mine (3)

This mine is to be found on a branch road, one quarter of a mile east of the road proceeding from Golding-Keene to East Alstead. The working consists of a tunnel driven into the vertical face of a cliff. The contact between pegmatite and schist is well exposed, and is knife-edge sharp. There are some ptygmatically folded pegmatite stringers to be seen.

About twenty feet above the tunnel entrance, in the center of the cliff, there is a group of rather large beryl crystals, pretty but inaccessible.

Photo by author

Fig. 3. View of Golding-Keene Mine. Two hundred forty feet to the bottom. See Fig. 4.

Allan Mine (4)

Continuing northward from the Britten Mine, a left turn at East Alstead, and three miles northwest, brings one to the Allan Mine. The pegmatite body occurs at the base of a local anticline in the schist, as may be seen from the accompanying photograph.

One of the first things to be noted was the common occurrence, in aggregates of boulder size, of small dissimilarly oriented "mica books." The color of the mica is silver green. Reflection from each of these books being in different directions, light striking the aggregate produces a pretty, scintillating effect. A good sized specimen was removed to the home of one of us (H.J.S.), where it now functions as an attractive and rather unusual specimen.

We found our best specimens of columbite at this mine.

It is difficult to distinguish columbite from tantalite in the field, altho both may be told from wolframite by their inferior cleavage. A spectrographic examination of columbite from the Allan Mine by Mr. E. K. Gedney and the author, using the spectroscope of the Department of Mineralogy of Harvard University indicates that it is a true columbite. A good deal of the so-called "columbite" from the pegmatites of central Maine is probably more nearly tantalite.

Specific gravity also serves to distinguish between these two closely similar minerals, pure columbite having a value of 5.3, and pure tantalite 7.3. Mixtures of the two are possible, with corresponding variation of specific gravity. Three determinations of the specific gravity of the Allan Mine material, using a Jolly balance, gave a mean result of 5.6, which is near to pure columbite.

Wenham Mine (5)

This mine is three miles west of Marlow.

The dump proved fairly remunerative. Besides the pegmatite minerals usual to the district, there were found here apatite and rose quartz, two minerals which had not been noted at any of the other pegmatites and whose absence was quite conspicuous when compared with the pegmatites of central Maine. The rose quartz is massive, and there appears to exist all gradations in color between it and smoky quartz. Apatite is green.

Turner Mine (6)

This is a mile to the west of the Wenham Mine.

Spodumene was found here, rather in abundance; the normal color is white, but

Photo by author

Fig. 4. Looking out into pit from gallery at the bottom. Golding-Keene Mine.

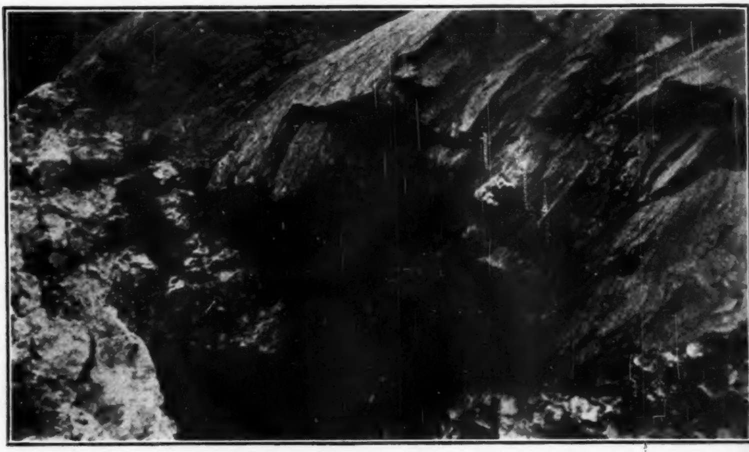


Photo by author

Fig. 5. Britten Mine, showing top of pegmatite body at left.

many specimens are colored rose pink, which is strongest around the border, and which, apparently, is due to a late alteration.

Also worthy of note is the occurrence of blue clevelandite, in considerable quantity.

Howard Mine (7)

This mine is about six miles north of Gilsum, on the Marlow road, one-half mile west of the Ashuelot river.

Quartz in very fine form was found here. One placque of milky quartz cyrstals that we acquired measures a foot across, and is almost of museum rank; the crystals average two and one-half inches in length, one-half inch wide, and are united in parallel growth.

In another habit of the quartz, the crystals are quite stout, and show only flat pyramidal faces, with the prism zone lacking entirely. These are frequently painted yellow brown by a coating of ochre.

A specimen of coarse graphic granite was obtained from the foreman which illustrates in quite a remarkable way the selective dissolving powers of pegmatite solutions. In this specimen, part of the quartz that solidified with the feldspar in the original eutectic has been cleanly removed without any modification or alteration of the contiguous feldspar, leaving a ramifying system of chambers, some of which are casts of the quartz unit rhombohedrons. There was subsequently introduced quartz of a later generation, so that the specimen (which measures a little less than a foot square) consists, on the one side, of a cellular framework of feldspar, with clear prismatic quartz crystals perched on the walls; on the other side is the normal, coarse graphic granite intergrowth, to which the solutions had not as yet made their way. The only similar specimen known to the writer is one collected by Prof. Larsen at Pala, California. It is of very much finer grain, and contains no later quartz; all of the original quartz has been removed.

The Yuhas Mine (8) was also visited, but nothing noteworthy was seen there. Our opinion is that it may be safely omitted by any who make the trip.

In conclusion, the writer would point out that rare and spectacular minerals are lacking in these deposits, and that, in general, only the commonest minerals of the acid pegmatites are to be met with; nevertheless, the trip is an enjoyable one to make.

Gems of the Southwest

— *By* —

NELL LOUNSBERRY

MALACHITE

Many generations ago, miners of the Sinai Peninsula were supplying the Ancient Egyptians with a bright green stone which they used for making gems and various ornaments and charms; amulets cut from the stone being worn as a protection from witchcraft, lightning and contagious diseases. The poorer grade material, being composed of about 37% copper, constituted the chief source of the useful metal at that time. Cameos were cut from it, the alternating layers of dark and light lending themselves remarkably well to the skilled hands of the cutters. From these antique cameos in our museums today, we know this ancient gem to be malachite, thought by some to have been identical with the Hebrew stone, Soham, one of the sacred jewels in the breast plate of the high priest.

In Russia, since olden times, malachite has been used for making table tops, mosaics, clock cases, snuff-boxes, etc., and as a veneer or inlay for costly furniture.

Although the best mines in the world are said to be those of Prince Deminoff, at Nizhni Tagilsk, on the Siberian side of the Ural Mountains, it is also found in France, Australia, Africa (Belgian Congo) and elsewhere in large quantities. In this country, the localities chiefly noted for the gem are Bisbee and Morenci, Arizona, where fine specimens have been found.

Malachite is difficult to work, having a tendency to break along lines and layers but regardless of its comparative softness (3.5 to 4) it takes an excellent polish. It is sub-translucent with a hard luster and ranges in color between apple-emerald and verdigris-green, often banded with other colors.

Although malachite is brittle as a rule, some varieties when fractured present a fibrous texture having a soft, silky luster. It is perhaps this characteristic which has enabled malachite to be passed off as turquoise although even then its coloring and inferior hardness should make it easily distinguishable.

While occasionally found in crystal form, malachite is usually encountered as an incrustation or stalactite among other ores of copper, and commonly in mass formation; in 1835 a solid chunk of malachite was found in the Ural Mountains which was more than 17 feet long and weighed 50,000 pounds.

Being a basic carbonate of copper, malachite, when present in sufficient quantities, becomes an important source of the metal, often mined for that purpose alone, or for paint pigment—being ground and sold under the name of "mountain-green."

Fluorescence: One of the most interesting collections of fluorescent minerals is owned by Mr. H. T. Strong of New York City. This collection has of late been utilized by the Packard Motor Company in their Color Show. Mr. Strong has made a life-long study of color and is most widely informed along these lines.

Arizona is the largest producer of copper in the Union.

The deepest shaft in Canada is on the property of Kirkland Lake Gold, in the Kirkland Lake area, Ontario, and is 4,100 feet deep.

A Mineralogical Occurrence of Iron Tannate

— *By* —

J. D. LAUDERMILK,

Box 184, Claremont, California

Recently while on an excursion to Cascade Canyon which is on the north slope of Mt. Ontario near Upland, California, the writer noticed certain stains of a dense bluish substance occurring as a coating on the walls of the canyon. In some places the coating was moderately extensive, covering areas several yards in extent. Some part of the deposit were of sufficient thickness to be flaked off in small scales.

Samples of the rock having the black stain were taken and subjected to analysis with the following results. Color bluish black to dull black. Luster submetallic to dull. Streak black. Hardness 1 to 2. G. n. d.

Reactions (from sample on white quartzite): before the blow-pipe the color changed in the oxidizing flame from black to red; the red deposit is identical with hematite. Fumes of vegetable matter undergoing combustion and sulphur and sulphur dioxide were noticed. Heated in closed tube considerable water was given off; the water was acid to litmus paper. Condensed water gave a white ppt. with barium chloride. Lead acetate paper was not blackened. Fumes from ignited vegetable matter were also given off. From these indications Iron, a decomposable sulphate and organic matter are present in the black coating. Sulphides absent.

Wet reactions: The mineral is insoluble in boiling water. Diluted hydrochloric, nitric and oxalic acids each dissolve it with the formation of a pale yellow or amber colored solution. Addition of ammonium hydroxide precipitates ferric hydroxide from the boiled solution in mineral acids and also from that in oxalic. Dilute ammonia (14%) added carefully to the hot oxalic solution (but not in excess) produces a greenish black ppt. Excess of 28% ammonia produces a dark blackish brown ppt. which masks the greenish coloration produced in the first case. The black mineral is also soluble in ammonia and alkaline hydroxides to a dark coffee colored solution.

Samples of the stain on quartzite were boiled in concentrated ammonia. The solution was filtered and evaporated to dryness on the water bath. Heated in closed tube the residues produced fumes of burnt vegetable matter with evolution of fumes of hydrogen sulphide as was indicated by the odor and blackening of lead acetate paper. The residues remaining after intense heating consisted predominantly of $Fe_2 O_3$. Traces of Ca, Mg and Mn compounds were present but only in very small amounts.

The above reactions indicated that an organic compound of iron having a black color was present as the cause of the black coloration. Iron tannate was immediately suggested as being the most likely. Assuming this to be the case the component factors were found as follows:

The stain was found to occur most abundantly upon: 1. Decomposed syenite having much pyrite. 2. Black quartzite the black color of which was due to pyrite. 3. White quartzite nearly free from other minerals but having scattered crystals of magnetite. 4. Corundum syenite having a small amount of pyrite. Samples of the rocks free from the black deposit were next tested for water soluble iron compounds.

The samples were ground in air which may cause the determinations to show a slightly higher amount of FeO and SO_3 than is actually present in the rocks.[1]

(1) W. F. Hillebrand, "The Analysis of Silicate and Carbonate Rocks," *U. S. Geological Survey Bull.* 700, page 60, 1919.

One gramme samples were taken for the analysis. The samples were boiled in distilled water for thirty minutes and extracted with boiling water. The total iron content was determined as $Fe_2 O_3$. For the SO_3 content the same method of boiling and leaching was followed using a separate sample of the rock powder. SO_3 was determined as $BaSO_4$ from the hot solution. The averages of closely agreeing duplicates are as follows:

1. Decomposed syenite

FeO	0.36%
SO_3	0.34%
Total water soluble $FeSO_4 . 7H_2O$	1.39%

2. Black quartzite

FeO	0.45%
SO_3	0.44%
Total water soluble $FeSO_4 . 7H_2O$	1.74%

Samples 3 and 4 showed no water soluble Fe compounds. The analysis shows a slight excess of iron over the amount of sulphur found assuming all the iron to be present as ferrous sulphate. Fumes of SO_3 were given off from the boiling solutions of 1 and 2, the cause of this not determined.

That the presence of the water soluble iron compound was not due to the grinding of the sample in air was shown by the fact that samples of the rock unpulverized and digested in cold water for 48 hours showed much iron and soluble sulphates by qualitative tests.

Source of the tannic acid

The slope of the canyon immediately above the deposit was densely covered with brush and scattered trees of live oak, maple and alder. The first is an evergreen which continually sheds its leaves while the last two are deciduous. A deposit of fallen leaves had formed to the depth of from two inches to a foot in places where the leaves had accumulated by drifting. Water leaching through the mass of leaves would take up sufficient tannin during the rainy season to produce the black coloration.

Grounds for believing this to be the case are: 1. The black deposit shows only on certain areas of the rock and in such areas it never extends upward from the evident place of origin but shows a trickled appearance downward to the foot of the canyon wall. Leaves and loose boulders lying at the base of the deposits are stained black from the percolating solution; such leaves and boulders have the appearance of having been dipped in ink. 2. Samples of decomposed syenite having water soluble iron salts but not exposed to water having the tannin content did not show the black mineral. In such cases the deposit was generally one of limonite ooze intermixed with algae. In places where the leaf deposit was abundant but lay above quartzite having no pyrite, no coloration showed. But in all cases where favorable conditions occurred (water soluble iron salts and tannin in solution) the black deposit was formed. In cases where the coating occurs on rocks free from pyrite it is secondarily deposited as described under 1.

Synthesis of the stain

A composite sample of the leaves as occurring was placed in a percolator and extracted with warm water, a dark brown solution resulted.

Upon adding the aqueous leaf extract to a solution of the water soluble component of the decomposed syenite a greenish ppt. resulted. The solution with the ppt. when allowed to evaporate in successive layers upon the surface of rocks placed in it produced a black coating identical in appearance with the natural substance.

Comparative tests carried out on both the natural and the artificial products are given below.

	Natural Coating	Prepared Sample
color	black	black
luster	dull	dull
hardness	1 to 2	soft, soils the hands
streak	black	black
heated b. p.	black to red	black to red
ammonia	brown solution	brown solution
dilute HCl	pale yellow sol.	pale yellow sol.
boiling water	insoluble	insoluble
oxalic acid	pale yellow sol.	pale yellow sol.
ammonia added to above	greenish black ppt.	same ppt. but darker
ammonia added to oxalic acid sol. in xs.	ferric hydroxide ppt.	same result

From the foregoing indications it appears reasonable to assume that the black mineral constitutes a natural occurrence of iron tannate or a related compound of iron and various tannin-like substances.

The Old Friedensville Zinc Mines

—— By ——
EUGENE W. BLANK,
State College, Pa.

In 1845 a mineral, found many years previous on the farm of Jacob Ueberroth one-half mile north of Friedensville, a small town three miles south of Bethlehem, Pa., was identified as calamine.

In 1853 furnaces were completed at Bethlehem for the production of zinc oxide from the Friedensville ore.

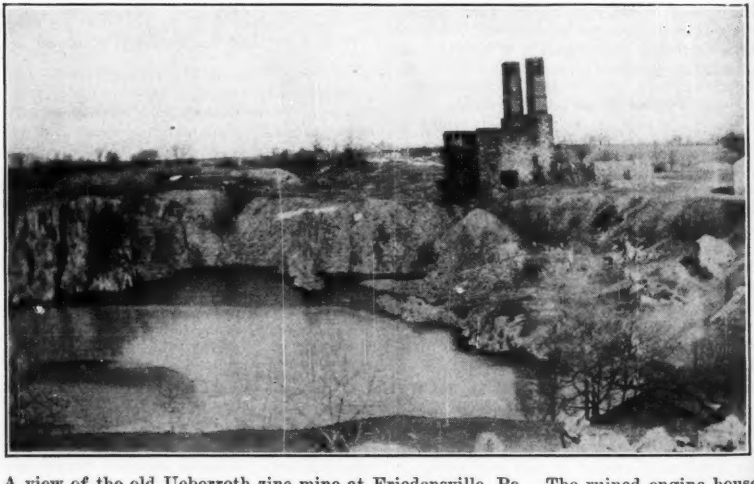
Zinc ore was taken continuously from the mines over a period of years extending from 1853 until November of 1893. Since that time all the various mines have been idle due to the fact that it is no longer economically feasible to compete with the zinc ores from Franklin Furnace, New Jersey or with the various deposits of zinc ore in the Middle West. The ore body is far from exhaustion in the Friedensville locality.

It is estimated that 50,000 tons of spelter and 90,000 tons of zinc oxide, valued at $20,000,000 have been produced from the Friedensville zinc ores. ([1])

Zinc ore has been found in paying quantity only in a very restricted area in and around Friedensville. The ore first worked consisted almost entirely of calamine, together with some smithsonite. With increased depth of the workings the calamine and smithsonite decreased rapidly and sphalerite associated with pyrite and marcasite became the chief ore.

The Friedensville sphalerite is of a peculiar character occuring in compact gray bluish black masses with a rather prominent conchoidal fracture and little crystallization. It may be mistaken on first appearance for dark blue limestone.

Other minerals occurring in the workings are melanterite, greenockite, goslarite, hydrozincite, sauconite, kaolin, quartz, calcite, aragonite and limonite. A single specimen of lanthanite in the form of a mass of delicate pink tabular crystals was found a few feet below the surface during the sinking of a shaft. The



A view of the old Ueberroth zinc mine at Friedensville, Pa. The ruined engine house is seen in the distance.

occurence probably represented a weathered boulder of allanite. ([2]) Dana has made reference to the deposits in his list of mineral localities.

The Ueberroth mine was the largest and most profitable of the mines in the locality. At present the open pit, which is approximately 500 feet in diameter, is filled with water to near the surface.

The only remaining buildings near the mine are the pumping engine house and an office both of which are in ruins. As the depth of the mine increased considerable difficulty was experienced with water and a pumping engine of gigantic proportions was constructed to keep the workings dry.

A newspaper clipping in the author's collection states that the engine was built in 1870 and that forty-four mules were required to pull some of the parts over the mountains. It is described as being a marvel in construction, its massive dimensions fully justifying its title, "The President."

The engine weighed about 1500 tons. Its cylinder had a diameter of 110 inches and a 10-foot stroke. Two flywheels weighed 107 tons each and were 40 feet in diameter. The two walking beams weighed 42 tons apiece. The connecting rods were 44 feet long and each weighed 10 tons. A brass nut securing the piston rod, alone weighed 1100 pounds.

When the mine closed down the engine was dismantled. Divers were employed to raise many of the parts submerged in water. Portions of the engine were remelted and used in new castings for the Battleship Maine.

(1) *Zinc Ores at Friedensville, Lehigh County, Pa.* Bulletin No. 70. Bureau of Topographic and Geological Survey, Harrisburg, Pa.
(2) *The Mineralogy of Pennsylvania* by Samuel G. Gordon. Academy of Natural Sciences, Philadelphia, Pa., 1922.

World's Deepest Producing Oil and Gas Well

The world's deepest producing oil and gas well is in the State of Texas. It is 8923 feet or just one and one-half miles in depth. The pay horizon from which oil is obtained in this well is Ordovician in age and corresponds to the Arbuckle Lime of Oklahoma and the Ellenberger Lime of Texas. Quite a little Silurian is penetrated immediately above the Ordovician which corresponds to the Niagara horizon of New York.

In the table below it will be seen that eight wells are producing at a depth of 8500 feet or deeper.

Table of Well Data

World's Deepest Prducing Area Big Lake Pool Reagon County, Texas

As of January 15, 1931

Company	Farm	Well No.	Total Depth		Daily Oil Production		Daily Gas Production
Texas Oil Co.	University Lands	1B	8525 ft.		2742	barrels	22,469,000 Cu. ft.
"	"	2B	8489 ft.	(Fishing pipe)	1501	"	32,000,000 Cu. ft.
"	"	3B	8533 ft.		1505	"	19,574,000 Cu. ft.
"	"	4B	8202 ft.	Still drilling			
Big Lake Oil Co.	"	1C	8670 ft.		1424	"	6,335,000 Cu. ft.
"	"	2C	8603 ft.		3011	"	29,532,000 Cu. ft.
"	"	3C	8923 ft.		152	"	905,000 Cu. ft.
"	"	4C	8697 ft.		2999	"	15,538,000 Cu. ft.
"	"	5C	8718 ft.		1375	"	25,433,000 Cu. ft.

A deep well recently completed in Irion County, Texas, by P. H. Williams, reached a depth of 8900 feet before it was abandoned with the hole full of salt water encountered at 8885 feet. This water had a temperature of 204°F and came from about 6200 feet below sea level. This well also drilled into Ordovician strata after penetrating some Cretaceous, Permian, Pennsylvania and probably Silurian sediments.

Interesting Localities and How to Reach Them

DEVIL'S DEN, NEWBURY, MASS.

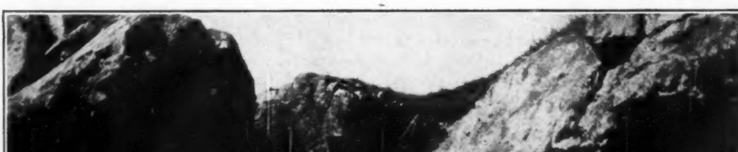
— *By* —

ELIZABETH A. DANIELS,
Lawrence, Mass.

Cordial Greetings, Members of the Rocks and Minerals Association!

On any of your trips during the coming vacation season are you planning to pass through this section of Massachusetts? If so, let me direct you to one of its natural wonders.

A gigantic rock, which has long been known as "Devil's Den," is found in Newbury, just a short distance out from Newburyport and only a little way from the beaten path. I am sure you will stand in awe before it, even as did we, pygmies in comparison as far as height was con-



Devil's Den, Newbury, Mass.

cerned, and wonder what mighty force lifted it there!

Follow High Street in the city of Newburyport until you come to the now famous filling station of Mayor Gillis, on the corner of High street and the Newburyport Turnpike. Proceed along the Turnpike for about two miles, keeping your eyes wide open for a low building on the **right** with this sign above the door—"Ye Turnpike Inn, Jr." The "Senior", just beyond, on the opposite side of the road, a short time ago burned to the ground. Leave the Turnpike and follow the road on the **left**, almost opposite "Ye Turnpike Inn, Jr." Just a short distance you go along this road, when you come to the first road on the **left** again which you take. Be careful or you will miss it, the distance is so short. It is now a straight road. When you have again traveled about two miles, begin to look, on the **left**, for bars no longer than the width of an ordinary gate. Just ahead you will see a railroad track. At the bars leave, of course, your car. Enter the wood, follow the path up the hill and you cannot miss the great rock.

There will be an added charm, if you are an ardent lover of minerals. So, after you have gazed sufficiently at the rock and speculated upon its origin, get busy and see how many of these minerals you can find. We have fine specimens from here of each of the following—and there may be many others:—Serpentine, of the rich oil-green color, known as noble or precious; picrolite (also a variety of serpentine); tremolite, in long blade-like crystals; vesuvianite; magnesite; chrysolite; and limestone.

If you have time to go a little farther along the road, cross the railroad track, stop at the first farm house and ask to be directed to Chipman's Silver Mine. There we have found fine specimens of mixed silver and lead ore, siderite, galena, limonite, malachite and pyrite.

Donations to Rocks and Minerals for 1930

Following is a list of donations received during the year 1930:

From Albert C. Bates, Newark, N. J. —a large series of pamphlets, photographic plates, minerals and three large pictures of minerals.

From Ramon Conover, Kyserike, N. Y.—a large series of photos and many minerals.

From George Grover, Port Chester, N. Y.—two fine cut and polished gems (rose quartz and labradorite). The labradorite was cut from a specimen brought down from Canada by McMillan, the Arctic Explorer.

From Mosaic Rock Picture Studio, Joseph City, Ariz.—"The Enchanted Crystal". This is a 2½ inch glass sphere mounted on a stand and contains various colored sands which are skillfully arranged in the sphere. These crystals are made exclusively by the Studio.

From Fred W. Schmeltz, New York, N. Y.—a large series of photos and some minerals.

From Ernest M. Skea, Transvaal, South Africa—84 pairs of unused 1½ penny King George tete-beche stamps of the Union of South Africa. Most of these have been sold and the proceeds, $20.00, have been added to Rocks and Minerals Monthly Fund.

From Henry Steen, Fort Bayard, N. Mexico—three archeological specimens (corn grinding stones used by the Mimbres Tribes during prehistoric times.)

From Geo. W. Swager, Sulphur, Nev., a nice selection of "desert sun colored glasses."

Bureau of Mines Notes and News Items

Contributed by the
U. S. BUREAU OF MINES
Washington, D. C.

Tantalum is a rare element—so rare in fact that estimates indicate there is less tantalum than gold in the earth's crust, according to the Bureau of Mines. Next to tungsten, tantalum has the highest melting point and the lowest vapor pressure of all metallic elements.

During 1929 platinum refiners in America purchased 516 ounces of crude placer platinum of domestic origin and 51,618 ounces of foreign crude platinum, according to the Bureau of Mines. Of the domestic material, 294 ounces were from Alaska, 208 ounces from California and 14 ounces from Oregon. Purchases of foreign crude platinum were: Australia 852 ounces, Canada 7 ounces, Colombia 45,687 ounces, Russia 6 ounces, and South Africa 5,066 ounces. During 1929, the high price of platinum was $110, the low at $56, and the average for the year at $67 an ounce, the refiners reported.

Other prices for rare metals given by the refiners for 1929 are: Iridium, high, $450, low $180, and average for year, $229 an ounce; Palladium, high, $50, low $31 and average for the year of $39 per ounce; Rhodium, from $40 to $55 per ounce; Osmium from $55 to $65 an ounce; and Ruthenium from $42 to $55 an ounce.

Nine small placer mines in Alabama, Georgia and North Carolina produced gold in 1929 to the value of $3,216; lode mines in two of these states and from Pennsylvania and Tennessee yielded gold to the amount of $33,577, of which $646 was from Georgia, $3,969 from North Carolina, $17,282 from Pennsylvania, and $11,680 from Tennessee. In Tennessee and North Carolina the gold was derived from copper ores, in Pennsylvania, from pyritiferous magnetite ores.

One of the simplest tests for selenium is to heat a little of the mineral on charcoal before the blowpipe. If containing selenium, it will emit a strong odor of decayed horse-flesh.

Selenium has been found in meteoric iron and in the mineral water from La Roche-Posay.

Marbles may be classed in three groups, say Dr. Oliver Bowles and D. M. Banks, in a report issued by the Bureau of Mines: (a) The first group, which includes by far the largest proportion of all marbles, comprises those resulting from the recrystallization of limestones. Most of them are highly crystalline and are usually white, though gray, black, or other markings may be present. The original rocks were formed in the sea, mainly accumulations of the calcareous remains of marine organisms which were consolidated to form coherent rocks termed "limestone". Heat and pressure, usually accompanied by extreme deformation of the beds, resulted in the highly crystalline condition which most commercial marbles exhibit. Fossiliferous or subcrystalline marbles have been subjected to less extreme metamorphism, the original fossils in many instances remaining almost intact. They possess sufficiently close texture to take a good polish and at the same time show attractive color effects.

(b) The second group comprises the onyx marbles. These consist essentially of calcium carbonate but are purely chemical deposits that have not resulted from metamorphism of preexisting limestone beds. Such calcareous chemical deposits are of two types. One, which is regarded as a product of precipitation from hot springs, is termed travertine. Most travertines are porous and are not capable of taking a fine polish. They are classed with limestones rather than with marbles. The other type, the true

onyx marble, is usually regarded as a deposit from cold-water solutions in limestone caves. Impurities, such as iron and manganese oxides, may be present in varying amounts in the successive layers of this marble, and thus a beautiful banding may result. This type is commonly known as Mexican onyx, because very fine deposits have been found in Mexico. Many onyx marbles are semi-translucent.

(c) The third type is known as "verd antique". The name is applied to marbles of prevailing green color, consisting chiefly of serpentine, a hydrous magnesium silicate. Verd antique is a highly decorative stone, the green color being interspersed at times with streaks or veins of red and white.

Radium, says Paul M. Tyler, in a report recently issued by the Bureau of Mines, appears on the market usually in the form of anhydrous bromide mixed with more or less barium bromide and packed in small sealed glass tubes. If freshly sealed, both the glass and contents are colorless or nearly so, but after some time the tubes are likely to become a deep violet color and the salt is likely to turn to a brownish tinge. Especially in freshly prepared tubes the salt may be luminous in the dark, but this is due to the presence of minor impurities as neither radium nor its compounds are luminous. The glass tubes are usually encased in lead as a protection to those that must handle them.

Radium is widely distributed in the earth's crust, but generally in infinitesimal quantities. Almost all rock samples, when examined by the most sensitive methods, show an extremely weak radioactivity. Igneous rocks, notably granites, are most active; but only the pure limestones and quartz sands are nearly inactive. The waters of various mineral springs that have been in contact with radioactive earth are almost always more or less radioactive.

Radium minerals are generally found in connection with granite masses, that is, where granite forms at least part of the rocks of the country. When original minerals, notably pitchblende, break down through weathering, other minerals are formed, such as autunite, torbernite, carnotite, and tyuyamunite.

Workable deposits or monazite occur in the United States in North and South Carolina, Idaho, and Florida, with North Carolina producing the bulk of the output.

The principal sources of sulphur in the world today are the United States, Italy, and Japan, with the former by far the major factor.

Cobalt is not found native and is nowhere mined except in conjunction with other metals, says Paul M. Tyler, in a report recently issued by the Bureau of Mines. In Cobalt, Ontario, Canada, the leading metal is silver, and in addition to cobalt, nickel and arsenic are present in the ores. In the Belgian Congo, cobalt is only a minor constituent of the copper ores. Bismuth is the most important constituent of the cobalt ores of Schneeberg, Germany. The New Caledonian deposits have been worked mainly for cobalt, but even there the cobalt is associated with manganese.

The commonest cobalt minerals are linnaeite (Co_3S_4, generally containing also some nickel and iron), smaltite ($CoAs_2$), cobaltite ($CoAsS$), and erythrite ($Co_3(AsO_4)_2 . 8H_2O$. Erythrite has a beautiful and quite characteristic peach-blossom color, but the first three minerals mentioned are silvery-looking and not easily distinguishable from several other minerals having a metallic luster. Manganese ores containing cobalt have a characteristic blue luster on the fresh dry fracture.

The story of the manufacture of the silverware that adorns practically every American dining table and sideboard is depicted interestingly in a new motion picture film recently completed by the Bureau, in cooperation with a large manufacturing concern. The film, which comprises three reels, is entitled "Silver, Heirlooms of Tomorrow."

Copies of this motion picture film may be obtained for exhibition purposes by schools, clubs, churches, civic and business organizations, or persons interested. Applications should be addressed to the Pittsburgh Experiment Station of the U. S. Bureau of Mines, 4800 Forbes St., Pittsburgh, Pa. No charge is made for the use of the film, but the exhibitor is asked to pay transportation charges.

The Gem Department

Conducted by GILBERT HART

Each issue Mr. Hart will give in this department information concerning gems and gem minerals. As Mr. Hart invites correspondence relating to the department, letters should be addressed to him as follows: Gilbert Hart, St. Edwards University, Austin, Texas.

GEM VARIETIES OF TOURMALINE

Chemically, tourmaline is classified by the various metals which may predominate in its molecules, as iron or chromium tourmaline. But for gem uses, the composition is immaterial, since the physical qualities of color, luster, and refractive index are the important characters. Common tourmaline is usually black or dull brown in color and has few gem uses. Black iron-rich tourmaline finds a limited place as a mourning stone, where its hardness and durability render it vastly superior to true jet, an anthracite coal. Rarely, smoky, brown magnesia-tourmaline is cut. These two types constitute the sole gems from opaque specimens of this mineral.

Precious tourmaline is any variety which possesses an attractive coloring and sufficient transparency to admit of cutting into stones showing the effects of dispersion of light through this color. Most specimens which fall in this class are rich in the alkali metals, particularly in lithium. The causes of color are not directly connected with the percentage of lithium, and are generally unknown; excepting that greens are thought to be associated with chromium.

Colorless tourmaline is called achroite by the mineralogist, but there is little use of this variety in the gem trade because of popularity of diamond, and of the less rare quartzes and colorless topazes. Red varieties often possess colors rivaling the ruby and are sold as SIBERITE or SIBERIAN RUBY. Rubellite, a pink to light rose tourmaline, is the most favored of all these gems at present. Yellow and green colors are frequent and are sold often as peridots. The names Brazilian Peridot, Brazilian Chrysolite, Ceylonese Chrysolite and Peridot of Ceylon suggest the coloring of the commoner specimens. Emeralite is a trade name for stones of the same deep green as emerald. The ancient Roman psagda was probably such a green tourmaline.

Blue gems of this class are gaining favor in many places, particularly the Brazilian Sapphire whose color approaches the corn-flower blue of the best sapphires. Indicolite is another blue gem, of indigo color or of almost any blue shade paler than this.

Among the odd stones which have been cut from tourmalines are those of two colors. Zoning of colors, perhaps due to changes of depositing solutions, are common in this mineral. At times beautiful rubellites have black or green lustrous tips. The bi-colored crystal may be cut into a very unusual brooch-stone or pendant.

Tourmaline is a rather common mineral, being found in veins associated with granitic rocks and often in the granites themselves as a definite constituent. All extensive granite areas carry more or less of this mineral. The gem varieties are much rarer, and often are limited to certain definite regions within the major igneous areas where there was a lack of iron and an abundance of the alkali metals. Bastin in his description of the Maine Pegmatites delineates a zone in that state where gem tourmalines occur, while in similar deposits elsewhere there is only the black tourmaline. Similar lithia zones occur in other fields of igneous activity, and in pegmatites which carry lepidolite, lithium phosphates and such minerals are found the most valuable gem material.

In stream gravels tourmaline is often noted as irregular fragments. Owing to

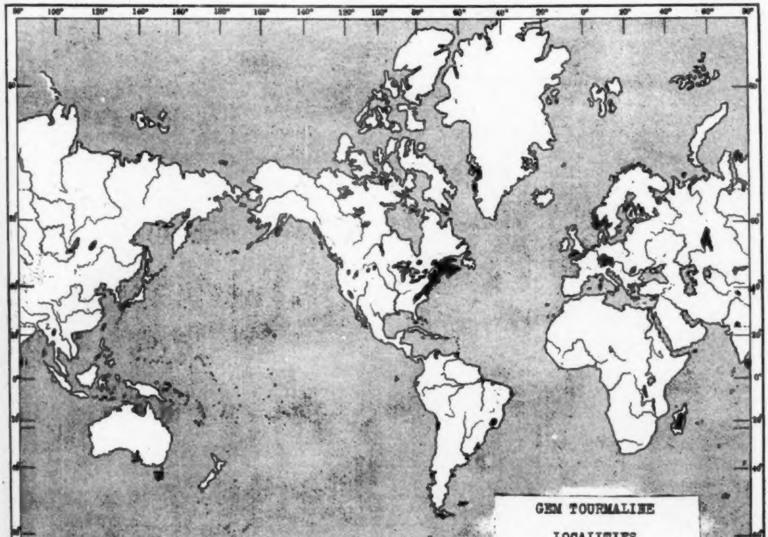
their brittleness crystals rarely travel far from their parent ledge before being broken to bits; and identification of portions of crystals in such deposits means that the prospector is near the pegmatite body.

Localities for gem tourmalines are world-wide, and new discoveries of easily mined material often temporarily glut the market. Such was noted several years ago at the time of development of the Palas, California deposits. These typical lithium pegmatites carry spodumene in gem varieties as well as tourmaline, and are comparable to the lithium district of Maine around Mt. Mica. Rubellites are the most important production here.

Occasional deposits of gem tourmaline are found in the northern Rockies. The Black Hills of South Dakota carry rubellite and indicolite. In the southern Appalachians similar occasional finds are recorded, but none comparable to the California deposits. In the Adirondack Mountains and further east in Maine and New Brunswick many gem tourmalines are found. Mt. Mica is a well known, but now practically exhausted locality which carried the blue variety more rarely than the pink and green ones. It is near the center of a considerable area in which tourmaline gems have been found in lithium-rich pegmatites. Such names as Mt. Apatite suggest to the collector many other rare minerals which are associated with these tourmalines.

Abroad, the most famous locality is in the Ekaterinburg district of the Ural Mountains. Here siberite, a brilliant red variety is mined. Madasgascar has produced many fine cabinet specimens but this country is not yet developed to the point of producing for gem cutters; although Lacroix mentions frequently the occurrence of gemmy crystals. Brazil is known to the jewelry trade as the home of tourmaline gems. Most of the gems come from Minas Geraes where the associated rocks are similar to those in the North American localities. Ceylon produces tourmalines, particularly the yellow-green varieties, as well as many other minerals of the gem classes.

The map shows the principal regions which have produced gem tourmalines. There are undoubtedly many other areas which will enter the field when their deposits are more closely examined and the value of the minerals better understood.



Our Junior Collectors

Some Day They May Be Our Leading Mineralogists

William C. McKinley, son of Mr. and Mrs. A. C. McKinley, 730-B Fourth St., Peoria, Illinois, is one of our most interested subscribers and members. So keen is his desire to see ROCKS AND MINERALS grow and prosper and the Rocks and Minerals Association firmly established throughout the country that he has personally written to a large number of individuals urging them to subscribe to the magazine and give it their support. Five new subscribers were thus obtained; and young William's name was placed on THE HONOR ROLL for 1930.

As the photograph shows, William has a fine collection of specimens from all over the world. Minerals, ores, gems and fossils are in his very fine collection and he has personally gathered many local minerals which he exchanged with collectors in other parts of the country for specimens that he did not possess. His name appears in the Exchange Department of this issue.

William is a student of Peoria Central High School and plans to study mining engineering, mineralogy and geology in college. We are predicting a bright future for this young collector.

William is also the Founder of the Rocks and Minerals Monthly Fund (See the Bulletin Board of this issue).

Courtsy of Peoria, Ill., Star

William C. McKinley with his collection.

Flagg Science Museum

Our readers will be interested to learn that there is in the United States a small science museum organized and conducted by boys fourteen years of age or younger. As far as is known, this is the only museum in the country to be managed by young boys and is attracting considerable attention far beyond the limits of Scarsdale, N. Y., its home town.

The Museum has a number of exhibits on various subjects, including an interesting display of rocks and minerals. Its main needs, in common with all museums, are more specimens, which will be appreciated whether loaned or given outright. Gerard Fountain, Jr., the Curator of Minerals, would like to correspond with collectors or amateur museums for the purpose of exchanging local minerals for others not in their collection.

The Museum publishes, twice a month, an attractive little paper **The Informer,** which is constantly increasing in circulation and we advise everyone to send for a sample copy and become subscribers to this very fine magazine and thus by your interest and co-operation encourage and support the boys in their good work. Interested individuals are cordially invited to become associates of the Museum.

The Museum, located at 9 Windmill Road, Scarsdale, is open to visitors Sunday afternoons or by appointment with the Director, Myron Read.

Both Mr. Read, the Director of the Museum, and Mr. Fountain, the Curator of Minerals, are subscribers to ROCKS AND MINERALS and members of the Rocks and Minerals Association.

One of the youngest mineralogists in the country is Raymond Seeburger, of Des Moines, Iowa, ten years old, who has a collection of 321 classified specimens of rocks, minerals and fossils. Besides numerous short trips throughout central Iowa, to hunt specimens, Raymond and his family take a long camping trip each summer and bring back many new specimens. Raymond's brother and sister, Albert and Louise, are also interested in science, and all three are diligent hunters and can identify the common rocks and minerals. Raymond hopes to have one of the best collections in his state by the time he is through school.

The Sluice Box

— *By* —

A. RIFFLE

I stopped in at "Old Bill's" house a few evenings ago. After the customary ritual of "cussing" the weather, his asthma, and the Administration, he got started on prospecting. That reminded me of a tale that a prospector of the younger generation had told me a few days before of getting lost in one of the old mines near Helena, Mont. I told the story to "Old Bill" and he in turn told me something that I will pass on to you.

He drew a complicated plan of a mine level with many branching drifts and crosscuts. "Now," he said, "I'll show you how to get out of a mine should you happen to get lost in one. Start from any point and keep going ahead but follow either the right or left side of the drift, all the time, that is, do not change from right to left if you start following the right side of the drift. It does not matter which direction you may face as long as you do not change sides after you start. Go clear to the end of every drift or crosscut and follow around the end, keeping your right side to the wall. If you keep this up you are bound to get to the portal or to the shaft that will lead you to the outside and freedom."

We tried this scheme out with several plans and it never failed. Make some sketches yourself and if you find a condition where this scheme will not work write it up for ROCKS AND MINERALS. It is possible that men have died in mines or caves who could have made their way out had they known this method.

A Compilation of Gem Names

—— *By* ——

GILBERT HART

St. Edwards University, Austin, Texas

Mr. Hart and ROCKS AND MINERALS will be glad to have readers send in additional gem stone names not here included or suggestions as to any corrections in names which they believe should be made.

This is a continuation of the very interesting compilation of gem names (the largest ever printed) made by Mr. Hart, the first installment of which appeared in the December, 1927, issue of the magazine. This list will be continued until completed.—The Editor.

Smoky Opal—opal, smoky brown.

Smoky Topaz—quartz, smoky. (2) topaz, smoky.

Sobrisky Opal—opal from Death Valley, Calif.

Sodalite—isometric; usually massive; blue to green; hardness 5.5 to 6; specific gravity 2.2; complex silicate of aluminum and sodium with chlorine.

Soldier's Stone—quartz, amethyst.

"Spanish"—prefix usually applied to an inferior gem of the color of the true gem named.

Spanish Emerald—beryl, emerald of the finest quality from South America.

Spanish Lazulite—cordierite.

Spanish Topaz—quartz, smoky, whose color has been altered to yellow by heat.

Spar—old name applied by miners to any light colored gangue mineral, but especially to quartz.

Specular Iron Ore—hematite.

Specularite—hematite in micaceous crystals.

Spessartite—member of the garnet group of silicates; isometric; usually in duodecahedra; red; hardness 7 to 7.5; specific gravity 4.2; silicate of manganese and aluminum.

Sphaerulite—obsidian with spherules of white mineral in a dark glass.

Sphalerite—a yellow to brown or black sulphide, rather soft, occasionally used as a gem.

Sphene—titanite.

Spinel—isometric, octahedra or massive; color varies from red thru green to black; hardness 8; specific gravity 3.5 to 3.8; double oxide of aluminum and magnesium. Gem names:**Balas, Balas Ruby, Blue Spinel, Ceylonite, Chlorospinel, Chlor Spinel, Disluite, Dysluite, Goutte de Sang, Pleonaste, Precious Spinel, Rubicelle, Ruby Spinel, Sapphirine, Siam Ruby, Spinel Ruby, Spinel Sapphire, Vermeille, Vinegar Spinel Zeylanite.**

"Spinel"—with a qualifying adjective or as a prefix refers usually to a gem of the spinel group having character denoted by other term.

Spinel Group—a group of double oxide minerals of iron or aluminum with some other basic oxide. Group is isometric, crystallizing in octahedra but usually found massive; all are hard and fairly heavy. Members used for gems: **Chromite, Franklinite, Gahnite, Hercynite, Magnetite, Spinel.** Gem names, not specifically determinable: **Adamantine Spinel, Alabandine Ruby, Almandine Spinel.**

Spinel Ruby—spinel, red.

Spinel Sapphire—spinel, blue.

Spinthere—titanite, greenish.

Spodumene—member of the pyroxene group of silicates; monoclinic; massive; green to purple; hardness 6:5 to 7; specific gravity 3.18; silicate of lithium and aluminum. Gem names: **California Iris, Hiddenite, Kunzite, Lithia Emerald, Triphane.**

St. Stephen Stone—quartz, chalcedony, translucent with blood red spots.

Stalactite—calcium carbonate in pendent masses deposited in caverns by evaporating water.

Stalagmite—calcium carbonate deposited by evaporating water on the floor of caverns.

"Star"—applied to asteriated gems, usually true gems (as named) which possess asterism.

Star Quartz—quartz, asteriated.

Star Ruby—corundum, ruby which shows a star of light.

Star Sapphire—corundum, grayish blue sapphire showing a star of light.

Star Stone—quartz, asteriated.
(2) corundum, star sapphire.

Star Topaz—corundum, asteriated oriental topaz.

Starolite—quartz asteriated.

Staurolite—orthorhombic, habit prisms, usually twinned; brown; hardness 7 to 7.5; specific gravity 3.72; hydrous silicate of iron and aluminum. Gem names: **Cross Stone, Fairy Stone, Lucky Stone, Staurotide.**

Staurotide—staurolite.

Steinheilite—cordierite.

Stibiotantalite—a rare tantalum-bearing mineral rarely used as ornamental stone because of its unusual composition.

"Stone"—applied especially to pebbles and water-worn gems with various color or locality adjectives.

Strahlite—actinolite.

Striped Agate—agate with wide parallel bands.

Striped Jasper—quartz, jasper with broad stripes of color.

Succinite—amber, a fossil resin similar to amber.
(2) grossularite, amber-colored.

Sulphur Diamond—pyrite.

Sun Opal—opal, fire-opal.

Sunstone—feldspar, usually oligoclase or labradorite, containing inclusions of scales of iron oxide.

Swiss Lapis—quartz, agate or jasper artificially colored blue.

Sycite—quartz, fig-shaped nodules of flint

"Synthetic"—refers to an artificial gem, often the artificial is merely a substitute of glass but may be chemically and crystallographically the same as the true gem.

Syrian Garnet—almandite, violet.

Tabasheer—amorphous opal-like silica deposited in joints of bamboo and used in native jewelry in the Orient.

Talc—amorphous; massive; green to white; hardness 1; specific gravity 2.75; hydrous silicate of magnesium; also called **Potstone.**

Tauridian Topaz—topaz, very pale blue.

Taxoite—serpentine, from Chester Co., Pa.

Test Stone—quartz, basanite.

Texas Agate—quartz, agate-jasper from Texas.

Thallite—epidote, yellowish green, sometimes transparent.

Thetis Hair Stone—quartz, sagenite, inclusions of green actinolite.

Thiosauite—anorthite from Iceland.

Thomsonite—a zeolite, orthorhombic, massive; pale green to red; hardness 5 to 5.5, specific gravity 2.35; hydrous silicate of calcium, sodium and aluminum. Gem names: **Carphostilbite, Chlorastrolite, Comptonite, Eye Agate, Eye Stone, Lintonite, Mesole, Ozarkite.**

Thulite—zoisite, rose-red.

Tiger Eye—crocidolite almost completely replaced by quartz which retains the fibrous structure, and enough iron oxides to give the yellow brown color.

Titanite—monoclinic, massive or in wedge-shaped crystals; green to yellow and brown; hardness 5 to 5.5, specific gravity 3.56; titano-silicate of calcium. Gem names: **Greenovite, Ligurite, Semeline, Sphene, Spinthere.**

Toad's Eye Tin—cassiterite with concentric structure.

Topaz—orthorhombic, prismatic; yellow and other pale colors; hardness 8, specific gravity 3.56; fluo-silicate of aluminum. Gem names: **Aquamarine Topaz, Brazilian Aquamarine, Brazilian Ruby, Brazilian Sapphire, Brazilian Topaz, Burnt Brazilian Topaz, Burnt Topaz, Colorado Topaz, Drop of Water, Flinder's Diamond, Golden Topaz, Goutte d' Eau, Indian Topaz, Pink Topaz, Pycnite, Rose Topaz, Royal Topaz, Saxon Chrysolite, Saxon Topaz, Siberian Topaz, Slave's Diamond, Smoky Topaz, Tauridian Topaz, Water Sapphire, White Topaz.**

"Topaz"—suffix used with color or locality adjective in reference to true topaz, but more often to quartz, or citrine quartz.

Topaz Cat's Eye—corundum, yellow and chatoyant.

Topazolite—andradite, colorless to yellowish or greenish.

Bibliographical Notes

The Osmiridium Deposits of the Adamsfield District: By P. B. Nye, M. Sc., B. M. E., Government Geologist. Geological Survey Bulletin No. 39—74 pages, 1 large geological sketch map (in color) of the district.

The Adamsfield District was, until the discovery of important deposits of osmiridium in 1925, a totally uninhabited region. It was probably only visited by an occasional hunter, and to a less extent by prospectors. The bulletin describes chiefly the geography and physiography, geology and the mining properties of the district.

Price 2/6—issued by the Geological Survey, Mines Department, Hobart, Tasmania.

Pit and Quarry Handbook and Directory: 23rd Edition, 1930. Price $5. Published and Copyrighted, 1930, by the Complete Service Publishing Co., 538 S. Clark St., Chicago, Ill. 778 pages with many illustrations.

A reference book of practical information for engineers and for prospectors, producers and manufacturers of non-metallic minerals and their products.

The Directory lists cement, gypsum, lime, sand, gravel, and crushed stone plants in two sections. Part 1—Alphabetical list of Producers; Part II—Geographical list of Producers.

The Handbook is well illustrated. Many advertisements by quarry products manufacturers are a special feature. A valuable handbook for those interested in quarrying or in any of its phases.

Good Mineral Specimens: Price List 333, December 1930—32 pages, 8 illustrations. This price list, featuring hundreds of choice and interesting minerals at reasonable prices—and from the world's most noted localities, has just been issued by the Ward's Natural Science Est., Inc., P. O. Box 24, Beechwood Sta., Rochester, N. Y. It is free, and we would advise all who are interested in purchasing minerals to send for a copy.

Nature Notes from the Grand Canyon. This little bulletin is issued for the purpose of giving information to those interested in the natural history and scientific features of the Grand Canyon National Park. It is a mimeograph publication, comes out monthly and issued free. Collectors interested in having their names placed on the bulletin's mailing list should address the Superintendent, Grand Canyon National Park, Grand Canyon, Arizona.

The Informer is the title of a little mimeograph publication, which is the official journal of the Flagg Science Museum, a museum organized and conducted by boys fourteen years of age or younger. It is gratifying to learn of boys so keenly interested in science as to organize and conduct a museum of their own (perhaps the only one of its kind in the country) and to issue a magazine also. The boys should be encouraged and we would like to suggest to our readers to send in their subscriptions to **The Informer** and have this little magazine come to them regularly. **The Informer** is issued twice a month and the subscription price can be obtained from the Editor, Myron Hall Read, 9 Windmill Lane, Scarsdale, N. Y.

A Catalogue of the Gem Minerals— Form 15. Issued free by The Gem Shop of Wolf Creek, Mont. More as a reference booklet than a price list, this interesting little catalogue of 16 pages lists a large number of minerals which are used as gems with scientific data for each specimen. The specimens listed are those carried in stock by The Gem Shop and prices are also quoted for each gem.

By all means send for a copy of "A Catalogue of the Gem Minerals."

THE ROCKS AND MINERALS ASSOCIATION

PEEKSKILL, N. Y., U. S. A.

Organized to stimulate public interest in geology and mineralogy and to endeavor to have courses in these subjects introduced in the curricula of the public school systems; to revive a general interest in minerals and mineral collecting; to instruct beginners as to how a collection can be made and cared for; to keep an accurate and permanent record of all mineral localities and minerals found there and to print same for distribution; to encourage the search for new minerals that have not as yet been discovered; and to endeavor to secure the practical conservation of mineral localities and unusual rock formations.

OFFICERS FOR 1930

Honorary President

Dr. Henry C. Dake, 793½ Thurman St., Portland, Ore.

Honorary Vice-Presidents

Dr. W. F. Foshag, Curator, U. S. National Museum, Washington, D. C.

Dr. L. J. Spencer, Keeper of Minerals, British Museum, London, England.

Dr. Bertha Chapman Cady, Girl Scouts, Inc., 670 Lexington Ave., New York, N. Y.

Charles W. Hoadley, Englewood, N. J.

Morrell G. Biernbaum, 17 Glencoe Road, Upper Darby, Penn.

Gilbert Hart, St. Edwards University, Austin, Texas.

Noyes B. Livingston, 1605 Virginia Place, Fort Worth, Texas.

Benjamin T. Diamond, M. A., 467 Riverdale Ave., Brooklyn, N. Y.

M. Mawby, 330 Chloride St., Broken Hill, N. S. W., Australia.

Edward Cahen, Birds Fountain, Dunsford, Exeter, Devonshire, England.

Secretary-Treasurer

Peter Zodac, Peekskill, N. Y.

Comment and Criticism

Editor of "R. & M.":—

May I urge you, emphatically, not to discontinue the publication of ROCKS AND MINERALS? If it were discontinued, a gap would be left which would paralyze the enthusiasm of many collectors and prevent the swelling of our ranks, for ROCKS AND MINERALS is the only connection between scattered mineral collectors throughout the Union and the World as well. A magazine, unlike a book, is a living thing. It cannot grow old, for it is reborn as each new issue is published.

I enjoyed very much the article by M. R. Thompson on his rock collection which appeared in the last issue. I wish you would publish more matter on this subject. The collecting of rocks is far easier, or shall I say, more gratifying to the city enthusiast who is tied down by expensive transportation to country localities. It is generally but a short walk to a subway excavation or to a short stretch of comparatively open country where interesting rock specimens may be readily picked up but where the outlook for minerals is extremely poor. If we city collectors, who cannot afford to buy expensive minerals, but who are ready and willing to spend much if not all of our spare time collecting and studying rocks in nearby localities could only have access, through ROCKS AND MINERALS, to new and interesting information on rocks, such as Mr. Thompson has so kindly given us, we would stick to the magazine through thick and thin.

WILLIAM S. SYKORA,
31-51—41st St., Long Island City, N. Y.

WITH OUR MEMBERS

Charles O. Fernquist, formerly curator of Minerals of the Public Museum at Spokane, Wash., is now residing in Los Angeles, Calif.

Collectors visiting Seattle, Washington, should not fail to see the very excellent mineral collection of Paul Hansen, located in the Cobb Building. Mr. Hansen, in addition to being a collector of minerals is also an expect lapidarist.

The mineral collection of one of our well known collectors, Dr. W. S. Beekman, is now on display at the University of Washington, Seattle, Wash. The collection consists mainly of well crystallized and unusually fine and large specimens and is well displayed in illuminated glass cases. At his residence, Dr. Beekman also has a fine collection of art objects carved from various minerals which he collected in the Orient. Dr. Beekman has been an ardent mineral collector for many years and during this time has given many "popular" lectures to the public on mineralogy and geology.

Fred W. Schmeltz of New York City, is touring the Southwest accompanied by his mother. Previous to his departure, Mr. Schmeltz had considerable correspondence with collectors residing in the Southwest so we are very sure he is going to visit many localities and will come back "loaded down" with choice specimens.

George W. Swager, of Sulphur, Nevada, presented ROCKS AND MINERALS with a nice selection of "desert sun colored glasses", which were found near his city. Bottles and other glass receptacles, after having been exposed to the hot desert sun and sands for many years, change from the original clear glass to various shades of purple and make beautiful "desert souvenirs". We are pleased to add this donation to our collection of curios.

MINERAL EXHIBIT AT JULIA POTWIN LIBRARY

Cabinets for the housing of a newly acquired collection of minerals were installed this week in the Julia Potwin Memorial Library, West Caldwell, N. J. The exhibition offers a view of the attractive and varicolored forms of minerals, and particular attention has been given the educational features of the collection in the arrangement of the specimens.

The minerals are placed in classified order and each bears a ticket with the designating species' numeral, the chemical constituents, crystalline structure and the locality from which each was obtained.

Although specimens are shown from localities throughout the world, New Jersey minerals are well represented. Among Jersey exhibits are minerals occurring in the traprock of the Watchung range and species peculiar to the limestone formations in Sussex County.

The cabinets contain space for future acquisitions. Ernest H. Wilson of 37 Forest Ave., Caldwell, N. J., presented the collection and will be curator of it. Additional specimens will be added from time to time.—**The Caldwell Progress,** issue of Jan. 16, 1931.

Editor's Note—Mr. Wilson is a subscriber to ROCKS AND MINERALS and a member of the Rocks and Minerals Association.

Our attention has recently been called to a boys' school in California which has among its many activities a mineral club known as The Voorhis Prospectors' Club. Twenty students of the school are members of this club and from all accounts it is a wide-awake and very active society. Recently the club made a trip to the extensive limestone quarries at Crestmore, near Riverside, California, and brought back many choice specimens of blue calcite, microcline, diopside, dolomite, garnet, chalcopyrite and limestone. Each member has a collection of minerals and the club also possesses a collection to which members contribute many of their choicest finds.

The Club meets twice a month for the purpose of discussions, exchange of specimens, testing minerals, planning future trips, etc. Walter Baranger is the President and Jimmy Suyehara is the Secretary.

The Club would be pleased to correspond with other clubs or to exchange specimens with amateur collectors. Address the Secretary, Voorhis Prospectors' Club, Voorhis School for Boys, San Dimas, California.

President's Page

—*By*—

DR. H. C. DAKE

MINERALOGICAL CLUBS

The reasons why every mineral collector or anyone interested in minerals should become a member of some local mineralogical organization are many. Compared to the number of collectors in the country we have very few local organizations and it is safe to say that only a very small percentage are affiliated with a local or district organization. At the present time the only active local organizations are situated in a few of the large cities of the east. While it is true that in many parts of the country, and, particularly, in the smaller cities, there are hardly a sufficient number of local collectors to form an organization, it has been suggested that in localities of this kind, organizations be formed to include those living within the state or several nearby states.

The benefits accruing from mineralogical societies are many. Much of the apparatus used for advanced work in mineralogy is costly and often beyond the purse of the individual collector or student, while with an organization of a number of collectors, instruments of this kind could be purchased for the use of all the members. The literature relative to mineralogy is widely disseminated in a rather large number of publications and here again an organization could function to a better advantage. A good reference library is essential and of considerable assistance to the worker in mineralogy. Most local organizations have a "club" collection of minerals to which the members contribute or loan specimens for display and study. Many collectors are handicapped in that they do not have a suitable place to house a collection at their disposal and to these individuals a "club" collection would be of great help.

The social advantages of an organization of this kind are quite obvious. Meetings of mineralogical organizations are usually well attended and it goes without saying they are very helpful and instructive to those interested in mineralogy and the allied sciences. All of our well-known mineralogical societies and clubs have done a great deal for the science and have doubtlessly aided in stimulating popular interest in minerals. As a rule the meetings of mineralogical organizations are open to visitors interested in minerals and it is urged by the writer that every reader attend these meetings whenever possible, with the idea in mind of affiliating with some organization. In order to keep up the interest of the younger generation, in minerals, it has been suggested that all local societies maintain a junior department, with a senior member in charge.

In the past few years new interest has been aroused in minerals, with the result that collectors are much more numerous than in years past. The editor of, and the contributors to, ROCKS AND MINERALS, have during the past few years received many inquiries relative to forming local and district organizations. The pages of ROCKS AND MINERALS, as well as the editing staff, are at the disposal of any individual or group wishing aid in forming an organization in their locality.

Mexico is the world's largest producer of silver, with the United States second and Canada third.

The largest producing gold mine in the United States is the Homestake Mine at Lead, S. D.

Membership Department

New Members Enrolled—Oct. 25, 1930—Jan. 25, 1931

THE HONOR ROLL FOR 1930

New Members secured during the year by:

The Gem Shop, Wolf Creek, Montana	41
Ward's Natural Science Est., Rochester, N. Y.	39
John A. Grenzig, Brooklyn, N. Y.	8
Maine Mineral Store, West Paris, Maine	8
George O. Wild, New York, N. Y. and Idar, Germany	8
Edmund H. Cienkowski, Philadelphia, Pa.	7
Noyes B. Livingston, Fort Worth, Texas	5
William C. McKinley, Peoria, Ill.	5
Hatfield Goudey, San Francisco, Calif.	5
Morrell G. Biernbaum, Philadelphia, Pa.	5

THE HONOR ROLL FOR 1931

New Members secured since Jan. 1, 1931, by:

John A. Renshaw, Arcadia, Calif.	5

ARIZONA

Hillside—Raber, Walter E.
Quartzsite—Keiser, W. G.

CALIFORNIA

Alameda—High School
Arcadia—Shier, Dr. W. C.
Barstow—Wilson, Albert C.
Daggett—Greer, Robert H.
Glendale—Smith, Rodney P.
Los Angeles—Carter, A. D.
Nolan, James P.
Oakland—Hagerman, Samuel J.
Orland—Birch, J. W.
Pasadena—Tefft, J. Q.
Riverside—Kimbell, C. J.
San Dimas—Clewett, Heber H.
San Francisco—Mook, Robert L.
Sperison, Francis
San Marino—Howes, E. H.
Santa Barbara—Smith, Edward C.
Wasco—Gilbreath, Melvin.

COLORADO

Denver—Shorten, M. H.

CONNECTICUT

Stamford—Guerrlich, T.
Waterbury—Patterson, Mrs. R. H.

DISTRICT OF COLUMBIA

Washington—Hoover, Jr., Geo. W.

GEORGIA

Stone Mountain—Freeman, Dr. J. P.

IDAHO

Kellogg—Yount, Ray.

ILLINOIS

Evanston—Garretson, Robert C.
LaGrange—Williams, Miss Lou

INDIANA

Brazil—Phillips, R. L.
Michigan City—Lass, Stanley
South Bend—Public Library

IOWA

Clinton—Wartburg College Library
Des Moines—Jeffrey, Donald W.
Seeburger, Raymond

KANSAS

Newton—Horst, L. C.

MAINE

Bethel—Carter, Miss Grace
Rowe, Herbert C.
Fryeburg—Peterson, F. H.
Portland—Moxcey, Bernard L.
South Paris—Public Library
West Paris—High School

MASSACHUSETTS

Boston—Perry, Geo. F.
Cambridge—Barteaux, Clyde Roland
Worcester—Elias, A. F.
Foster, Edward C.

MICHIGAN

Ann Arbor—Goodrich, Calvin
Dearborn—Sherman, J. Abner
Flint—Demorest, Harry

MINNESOTA

Franklin—Hage, Glenn
St. Paul—Miller, James

MONTANA

Livingston—Evans, Don C.
Sheridan—Gossett, J. N.
Stevensville—Jarvis, Randall

NEBRASKA

North Loop—Black, E. W.

NEVADA

Beatty—O'Brien, Jos. D.

NEW JERSEY

Boonton—Doremus, E. C.
Collingswood—Thatcher, Edgar C.
East Orange—Davis, Mrs. Arthur
Lake Wildwood—Babcock, William
Orange—Barone, Edward T.
Paterson—Casperson, Wm. C.
Manley, Joseph F.
Springfield—Benkert, Wm. R.
Wenonah—Burdsall, Ogden
West Caldwell—Julia Potwin Library

NEW YORK

Bronxville—Stegle, Joseph J.
Malone—Lord, Floyd
Whipple, Hollis G.
New York—Heath, Royal V.
McIntosh, F. P.
Wellman, Walter D.
Niagara Falls—Hinckley, Arthur T.
Rochester—Kaucher, Miss Mildred
Scarsdale—Fountain, Jr., Gerard
White Plains—Spiro, Walter J.

NORTH CAROLINA

Raleigh—Dept. of Con. & Development
Stanley—Johnston, A. L.

OHIO

Elyria—Platner, J. Warren
Norwood—Kiefel, Miss Emma
Toledo—Paquette, Walter J.
Waynesburg— Baker, C. W.

OKLAHOMA

Tulsa—Toole, Dr. A. Clarkson

PENNSYLVANIA

Franklin—Lemcke, W. L.
Hanover—Renoll, Kenneth L.

SOUTH CAROLINA

Spartanburg—Fraser, Donald S.

TEXAS

Conroe—Nichols, James
Houston—Kroemer, F. W.
Kenedy—Nichols, B. J.

VIRGINIA

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